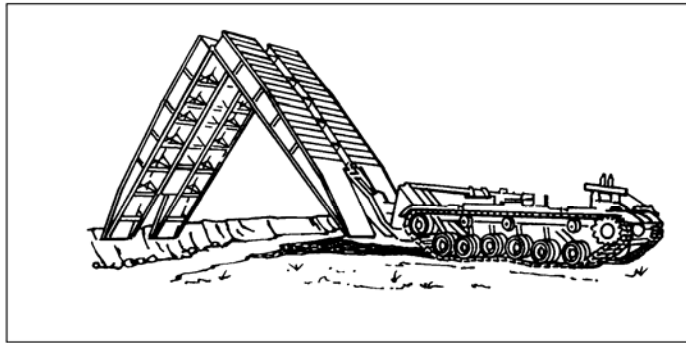


**STP 5-12B1-SM**

**MOS 12B, COMBAT  
ENGINEER, SKILL LEVEL 1,  
SOLDIER'S MANUAL**



**OCTOBER 2002**

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**HEADQUARTERS  
DEPARTMENT OF THE ARMY**

SOLDIER TRAINING  
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DEPARTMENT OF THE ARMY  
Washington, DC, 18 October 2002

## MOS 12B, Combat Engineer, Skill Level 1, Soldier's Manual

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## PREFACE

This publication is for skill level (SL) 1 soldiers who hold a military occupational specialty (MOS) of 12B and their trainer or leader. It contains standardized training objectives in the form of task summaries that may be used to train and evaluate soldiers on critical tasks that support unit missions during wartime. Soldiers holding MOS 12B should have access to this publication. Trainers and leaders should actively plan for soldiers holding MOS 12B to have access to this publication.

Most tasks in this manual are applicable to the active-component (AC) and the reserve-component (RC) soldiers, which include the Army National Guard (NG) and the Army Reserve. However, some tasks are only for AC soldiers due to differences of equipment and missions. Tasks unique to RC soldiers are identified by (RC) following the task title and grouped into RC unique subject areas.

Users of this publication are encouraged to recommend changes and submit comments for its improvement. Comments should be keyed to a specific page, paragraph, and line of the text in which the change is recommended. Reasons will be provided for each comment to ensure understanding and complete evaluation. Comments should be prepared using a Department of the Army (DA) Form 2028 and forwarded directly to the Commandant, United (US) Army Maneuver Support Center, ATTN: ATSE-DT-WR-E, Building 3200, Directorate of Training Development, 320 MANSCEN Loop, Suite 246, Fort Leonard Wood, MO 65473-8929.

Unless this publication states otherwise, masculine nouns and pronouns do not refer exclusively to men.

## CHAPTER 1

### General

#### GENERAL

1-1. This manual identifies the individual MOS training requirements for soldiers in MOS 12B. Skill Level (SL) 1. It is designed to be used by commanders, trainers, and soldiers to plan, conduct, and evaluate individual training in units. This manual is the primary reference for supporting self-development, evaluating MOS proficiency, and training of 12B soldiers. Commanders employ two primary methods to evaluate soldiers' proficiency:

- **Commander's evaluation.** Commander's evaluations are local tests or assessments of soldiers' performance of MOS-specific and common tasks critical to the unit mission. They may be conducted year-round.
- **Common task test (CTT).** CTTs are hands-on test used to evaluate proficiency on common tasks. Alternate written tests are provided if equipment is not available for hands-on testing.

1-2. This manual should be used along with Soldier Training Publications (STPs) 21-1-Soldier's Manual of Common Tasks (SMCT) and 21-24-SMCT; Army Training and Evaluation Programs (ARTEPs); and Field Manuals (FMs) 25-4, 25-5, 25-100, and 25-101 to establish effective training plans and programs that integrate individual and collective tasks.

#### TASK SUMMARIES

1-3. Task summaries contain information necessary to conduct training and evaluate soldier proficiency on tasks critical to the MOS. A separate task summary is provided for each critical task. These task summaries are, in effect, standardized training objectives which ensure that soldiers do not have to relearn a task on reassignment to a new unit. The format for the task summaries included in this manual is as follows:

- **Task Title.** The task title identifies the action to be performed.
- **Task Number.** A 10-digit number identifies each task or skill. Include this task number, along with the task title, in any correspondence relating to the task.
- **Conditions.** The task conditions identify all of the equipment, tools, references, job aids, and supporting personnel that the soldier needs to perform the task in wartime. This section identifies any environmental conditions that could alter performance, such as the visibility, temperature, and wind. This section also identifies any specific cues or events (a chemical attack or identification of a threat vehicle) that triggers task performance.
- **Standards.** The task standards describe how well and to what level you must perform a task under wartime conditions. Standards are typically described in terms of accuracy, completeness, and speed.
- **Training and Evaluation.** This section may contain all or part of the following: training information outline, evaluation preparation subsection, and evaluation guide. The training information outline includes detailed training information. The evaluation preparation subsection indicates the necessary modifications to the task performance in order to train and evaluate a task that cannot be trained to the wartime standard under wartime conditions. It may also include special training and evaluation

preparation instructions to accommodate these modifications and any instruction that should be given to the soldier before the evaluation. The evaluation guide identifies the specific actions, known as performance measures, that the soldier must do to successfully complete the task. These actions are listed in a *pass/fail* format for easy evaluation. Each evaluation guide contains a feedback statement that indicates the requirements for receiving a GO on the evaluation.

- *References.* This section identifies references that provide more detailed and thorough explanations of task performance requirements than that given in the task summary description.

1-4. Additionally, some task summaries include safety statements and notes. Safety statements (danger, warning, and caution) alert users to the possibility of immediate death, personal injury, or damage to equipment. Notes provide a small, extra supportive explanation or hint relative to the performance measures.

## **SOLDIER'S RESPONSIBILITIES**

1-5. Each soldier is responsible for performing individual tasks which the first-line supervisor identifies based on the unit's mission essential task list (METL). The soldier must perform the task to the standards listed in the soldier's manual (SM). If a soldier has a question about how to do a task or which tasks in the manual he must perform, it is the soldier's responsibility to ask the first-line supervisor for clarification. The first-line supervisor knows how to perform each task or can direct the soldier to the appropriate training materials.

## **NONCOMMISSIONED OFFICER SELF-DEVELOPMENT AND THE SOLDIER'S MANUAL**

1-6. Self-development is one of the key components of the leader development program. It is a planned, progressive, and sequential program followed by leaders to enhance and sustain their military competency. It consists of individual study, research, professional reading, practice, and self-assessment. Under the self-development concept, the noncommissioned officer (NCO), as an Army professional, has the responsibility to remain current in all phases of the MOS. The SM is the NCO's primary source for use in maintaining MOS proficiency.

1-7. Another important resource for NCO self-development is the Army Correspondence Course Program (ACCP). (See Department of the Army (DA) Pamphlet 351-20 for information on enrolling in this program and for a list of courses, or write to: Army Institute for Professional Development, United States (US) Army Training Support Center, ATTN: ATIC-IPS, Newport News, Virginia 23628-0001.)

1-8. Unit learning centers are valuable resources for planning self-development programs. They can help access enlisted career maps, training support products, and extension training materials.

## **TRAINING SUPPORT**

1-9. This manual includes the following appendixes and information that provide additional training support information:

- *Appendix A, Training Ammunition.* This appendix lists the mines and explosives, live and inert, required to support the training of critical tasks contained in the SM.
- *Appendix B, Department of the Army (DA) Form 5164-R (Hands-On Evaluation).* This appendix provides an overprinted copy of DA Form 5164-R for the tasks contained in the SM. The NCO trainer can use this form to set up the leader book described in FM 25-101. The use of this form may help preclude writing the soldier tasks associated with the unit's METL and can become a part of the leader book.

- *Appendix C, Department of the Army (DA) Form 5165-R (Field Expedient Squad Book).* This appendix provides an overprinted copy of DA Form 5165-R for the tasks contained in the SM. The NCO trainer can use this form to set up the leader book described in FM 25-101. The use of this form may help preclude writing the soldier tasks associated with the unit's METL and can become a part of the leader book.
- *Appendix D, Conversion Factors (United States [US] Units and Metric).* This appendix provides an English to metric measurement conversion chart.
- *Glossary.* This glossary is a single comprehensive list of acronyms, abbreviations, definitions, and letter symbols.
- *References.* This section contains two lists of references, required and related, that support the training of all tasks in this SM. Required references are listed in the conditions statement and are required for the soldier to do the task. Related references are materials that provide more detailed information and a more thorough explanation of task performance.

## ENLISTED PERSONNEL MANAGEMENT SYSTEM

1-10. The Enlisted Personnel Management System (EPMS) (AR 614-200) is the Army's overall system to improve the professionalism of the enlisted force. It integrates policies relating to training, evaluation, classification, and promotion into an overall system. It provides the soldier with a means to look to the future and see a realistic, clear, and viable career progression path from private to sergeant major (SGM). However, the EPMS is useless if the soldier does not understand and use it. Part of the trainer's job is to make sure that the soldier understands and uses the EPMS. As an aid, Figure 1-1 provides the trainer with a career map for the 12B soldier. Along with information contained in AR 614-200, the soldier can use the career map to develop goals early in his career and plan accordingly.

NCOES	PLDC	BNCOC		ANCOC	USASMA	
Civilian schools	High school, GED diploma	College*				
		1 year	2 years	3 years		
		A goal: troop assignments often preclude off-duty education.				
Other schools	Drill Sergeant School Recruiting School                      Battle Staff Course 					

**Figure 1-1. Career Map, Career Management Field (CMF) 12**

**SKILL PROGRESSION CHART**

1-11. Similar or related education, training, and experience are grouped into CMFs. The career progression path for MOS 12B, CMF 12, Combat Engineer, is shown in Figure 1-2.

E-9	00Z50 Command Sergeant Major
SL 5 E-8 through E-9	12Z50 Combat Engineer 1st Sergeant
SL 4 (E-7)	12B40 Combat Engineer Platoon Sergeant
SL 3 (E-6)	12B30 Combat Engineer Squad Leader
SL 2 (E-5)	12B20 Combat Engineer Team Leader
SL 1 (E-1 through E-4)	12B10 Combat Engineer
	Trainee

**Figure 1-2. Career Progression Sequence for Combat Engineering (CMF) 12**

## CHAPTER 2

### Training Guide

2-1. General. The MOS Training Plan (MTP) identifies the essential components of a unit training plan for individual training. Units have different training needs and requirements based on differences in environment, location, equipment, dispersion, and similar factors. Therefore, the MTP should be used as a guide for conducting unit training and not a rigid standard. The MTP consists of two parts. Each part is designed to assist the commander in preparing a unit training plan which satisfies integration, cross training, training up, and sustainment training requirements for soldiers in this MOS.

Part One of the MTP shows the relationship of an MOS skill level between duty position and critical tasks. These critical tasks are grouped by task commonality into subject areas.

Section I lists subject area numbers and titles used throughout the MTP. These subject areas are used to define the training requirements for each duty position within an MOS.

Section II identifies the total training requirement for each duty position within an MOS and provides a recommendation for cross training and train-up/merger training.

- **Duty Position column.** This column lists the duty positions of the MOS, by skill level, which have different training requirements.
- **Subject Area column.** This column lists, by numerical key (see Section I), the subject areas a soldier must be proficient in to perform in that duty position.
- **Cross Train column.** This column lists the recommended duty position for which soldiers should be cross trained.
- **Train-up/Merger column.** This column lists the corresponding duty position for the next higher skill level or MOSC the soldier will merge into on promotion.

Part Two lists, by general subject areas, the critical tasks to be trained in an MOS and the type of training required (resident, integration, or sustainment).

- **Subject Area column.** This column lists the subject area number and title in the same order as Section I, Part One of the MTP.
- **Task Number column.** This column lists the task numbers for all tasks included in the subject area.
- **Title column.** This column lists the task title for each task in the subject area.
- **Training Location column.** This column identifies the training location where the task is first trained to soldier training publications standards. If the task is first trained to standard in the unit, the word "Unit" will be in this column. If the task is first trained to standard in the training base, it will identify, by brevity code (ANCOC, BNCOC, etc.), the resident course where the task was taught. Figure 2-1 contains a list of training locations and their corresponding brevity codes.

<b>AIT</b>	Advanced Individual Training
<b>ASI/SD</b>	Additional Skill Identifier/Special Duty
<b>UNIT</b>	Trained in the Unit
<b>RESIDENT</b>	Resident Job Training
<b>OSUT</b>	One Station Unit Training

**Figure 2-1. Training Locations**

- **Sustainment Training Frequency column.** This column indicates the recommended frequency at which the tasks should be trained to ensure soldiers maintain task proficiency. Figure 2-2 identifies the frequency codes used in this column.

<b>BA</b>	- Biannually
<b>AN</b>	- Annually
<b>SA</b>	- Semiannually
<b>QT</b>	- Quarterly
<b>MO</b>	- Monthly
<b>BW</b>	- Bi-weekly
<b>WK</b>	- Weekly

**Figure 2-2. Sustainment Training Frequency Codes**

- **Sustainment Training Skill Level column.** This column lists the skill levels of the MOS for which soldiers must receive sustainment training to ensure they maintain proficiency to soldier's manual standards.

2-2. Subject Area Codes.

**Skill Level 1**

- 1 Basic Mine Warfare
- 2 Basic Demolitions
- 3 Basic Combat Construction
- 4 Basic Equipment Maintenance
- 5 Basic Rigging
- 6 Basic Vehicle Operations
- 7 Basic Nuclear, Biological, Chemical (NBC) Operations
- 8 Basic Gunnery Operations
- 9 Basic Communication
- 10 Fixed Bridging
- 11 Basic Individual Techniques

2-3. Duty Position Training Requirements.

2-4. Critical Tasks List.

**MOS TRAINING PLAN  
12B1**

**CRITICAL TASKS**

Subject Area	Task Number	Title	Training Location	Sust Tng Freq	Sust Tng SL
<b>Skill Level 1</b>					
1. Basic Mine Warfare	052-192-1021	Locate Mines by Visual Means	AIT	SA	1
	052-192-1105	Install an M15 Antitank (AT) Mine Using the	AIT	SA	1



## CRITICAL TASKS

Subject Area	Task Number	Title	Training Location	Sust Tng Freq	Sust Tng SL
		M624 Fuse			
	052-192-1106	Remove an M15 Antitank (AT) Mine With the M624 Fuse	AIT	SA	1
	052-192-1107	Install an M15 Antitank (AT) Mine Using the M603 Fuse	AIT	SA	1
	052-192-1108	Remove an M15 Antitank (AT) Mine Using the M603 Fuse	AIT	SA	1
	052-192-1109	Install an M19 Antitank (AT) Mine	AIT	SA	1
	052-192-1110	Remove an M19 Antitank (AT) Mine	AIT	SA	1
	052-192-1117	Install an M21 Antitank (AT) Mine	AIT	SA	1
	052-192-1118	Remove an M21 Antitank (AT) Mine	AIT	SA	1
	052-192-1127	Prepare an AN/PSS-12 Mine Detector for Operation	AIT	QT	1
	052-192-1128	Locate Mines With the AN/PSS-12 Mine Detector	AIT	QT	1
	052-192-1141	Load a Multiple-Delivery Mine System (Volcano)	AIT	SA	1
	052-192-1154	Install an M5 Pressure-Release Firing Device on Antitank (AT) Mines	AIT	SA	1
	052-192-1155	Remove an M5 Pressure-Release Firing Device From Antitank (AT) Mines	AIT	SA	1
	052-192-1225	Emplace an M93 Hornet ( Wide-Area Munition [WAM]) for Manual Operations	AIT	MO	1
	052-192-1230	Identify Mines and Firing Devices, Friendly and Enemy	AIT	MO	1
	052-192-1231	Perform Preventive-Maintenance Checks and Services (PMCS) on the Mine Clearing Line Charge (MICLIC)	AIT	SA	1
	052-192-1232	Prepare a Modular-Pack Mine System (MOPMS) for Operation in the Hardwired Mode	AIT	SA	1
	052-192-1233	Identify the Components of a Multiple-Delivery Mine System (Volcano)	AIT	SA	1
2. Basic Demolitions	052-193-1013	Neutralize Booby Traps	AIT	QT	1
	052-193-1101	Install an M142 Multipurpose Firing Device	AIT	QT	1
	052-193-1102	Remove an M142 Multipurpose Firing Device	AIT	QT	1

## CRITICAL TASKS

Subject Area	Task Number	Title	Training Location	Sust Tng Freq	Sust Tng SL
	052-193-1310	Construct Demolition Firing Systems	AIT	QT	1
	052-193-1311	Prime Military Explosives	AIT	QT	1
	052-193-1312	Construct Demolition Initiating Sets	AIT	QT	1
	052-193-1313	Identify Characteristics of Military Demolitions and Explosives	AIT	QT	1
3. Basic Combat Construction	052-195-1020	Install Wire Obstacle Materials	AIT	AN	1
4. Basic Equipment Maintenance	052-201-1180	Perform Operator Preventive-Maintenance Checks and Services (PMCS)	ASI/SD	AN	1
	052-226-1012	Perform Preventive-Maintenance Checks and Services (PMCS) on the Bridge of the Armored-Vehicle-Launched Bridge (AVLB)	ASI/SD	AN	1
	052-226-1101	Perform Preventive-Maintenance Checks and Services (PMCS) on the Launcher of an Armored-Vehicle-Launched Bridge (AVLB)	ASI/SD	AN	1
	052-226-1260	Repair Track Components on an Armored-Vehicle-Launched Bridge (AVLB)	ASI/SD	AN	1
	052-227-0110	Repair Track Components on an Armored Combat Earthmover (ACE), M9	ASI/SD	AN	1
	052-227-1005	Perform Operator Preventive-Maintenance Checks and Services (PMCS) on an Armored Combat Earthmover (ACE), M9	ASI/SD	AN	1
	052-227-1104	Disconnect the Final Drives on an Armored Combat Earthmover (ACE), M9	ASI/SD	AN	1
5. Basic Rigging	052-200-1075	Tie Knots	AIT	AN	1
	052-227-1110	Unfold the Blade of an Armored Combat Earthmover (ACE), M9	ASI/SD	QT	1
6. Basic Vehicle Operations	052-225-1213	Drive an Armored-Vehicle-Launched Bridge (AVLB)	ASI/SD	MO	1
	052-225-1214	Start the Engine of an Armored-Vehicle-Launched Bridge (AVLB)	ASI/SD	MO	1
	052-225-1216	Extinguish a Fire on an Armored-Vehicle-Launched Bridge (AVLB)	ASI/SD	MO	1
	052-225-1217	Operate the Night Viewer on an Armored-Vehicle-Launched Bridge (AVLB)	ASI/SD	MO	1

## CRITICAL TASKS

Subject Area	Task Number	Title	Training Location	Sust Tng Freq	Sust Tng SL
	052-225-1250	Stop the Engine on an Armored-Vehicle-Launched Bridge (AVLB)	ASI/SD	MO	1
	052-226-0202	Hydraulically Slave an Armored-Vehicle-Launched Bridge (AVLB)	ASI/SD	SA	1
	052-226-1013	Retrieve the Armored-Vehicle-Launched Bridge (AVLB): Operator	ASI/SD	MO	1
	052-226-1049	Launch an Armored-Vehicle-Launched Bridge (AVLB)	ASI/SD	MO	1
	052-226-1060	Load the Bridge from an Armored-Vehicle-Launched Bridge (AVLB) onto a Trailer	ASI/SD	QT	1
	052-226-1061	Unload a Bridge from a Trailer to an Armored Vehicle Launcher	ASI/SD	QT	1
	052-227-1103	Operate the Winch of an Armored Combat Earthmover (ACE), M9	ASI/SD	AN	1
	052-227-1106	Operate a Fixed Fire Extinguisher on an Armored Combat Earthmover (ACE), M9	ASI/SD	MO	1
	052-227-1111	Fold the Blade of an Armored Combat Earthmover (ACE), M9	ASI/SD	QT	1
	052-227-1200	Perform Dozing Operations with an Armored Combat Earthmover (ACE), M9	ASI/SD	QT	1
	052-227-1225	Drive an Armored Combat Earthmover (ACE), M9	ASI/SD	MO	1
	052-227-1233	Perform Fording Operations with an Armored Combat Earthmover (ACE), M9	ASI/SD	MO	1
	052-227-1226	Construct Vehicle Fighting Positions with an Armored Combat Earthmover (ACE), M9	ASI/SD	MO	1
	052-227-1240	Perform Scraper Operations with an Armored Combat Earthmover (ACE), M9	ASI/SD	MO	1
	052-227-1241	Handle Palletized Cargo with an Armored Combat Earthmover (ACE), M9	ASI/SD	MO	1
	052-227-1250	Conduct Recovery Operations with an Armored Combat Earthmover (ACE), M9	ASI/SD	MO	1
7. Basic Nuclear, Biological, Chemical (NBC) Operations	052-227-1135	Operate a Nuclear, Biological, Chemical (NBC) System	ASI/SD	QT	1
8. Basic Gunnery	052-225-1101	Load an M239 Grenade Launcher on an Armored-Vehicle-Launched Bridge	ASI/SD	AN	1

## CRITICAL TASKS

Subject Area	Task Number	Title	Training Location	Sust Tng Freq	Sust Tng SL
Operations		(AVLB)/Armored Combat Earthmover (ACE), M9			
	052-225-1102	Unload an M239 Grenade Launcher on an Armored-Vehicle-Launched Bridge (AVLB)/Armored Combat Earthmover (ACE), M9	ASI/SD	QT	1
	071-004-0001	Maintain an M9 Pistol	UNIT	QT	1
	071-004-0003	Load an M9 Pistol	UNIT	QT	1
	071-022-0001	Maintain a Caliber .50 M2 Machine Gun	UNIT	QT	1
	071-022-0003	Load a Caliber .50 M2 Machine Gun	UNIT	QT	1
	071-022-0005	Correct Malfunctions of a Caliber .50 M2 Machine Gun	UNIT	QT	1
9. Basic Communication	052-225-1210	Communicate by Using Visual Signals	ASI/SD	AN	1
	113-587-0058	Perform Operator's Troubleshooting on SINCGARS	AIT	BM	1
	113-587-2070	Operate SINCGARS Single-Channel (SC)	AIT	BM	1
	113-587-2071	Operate SINCGARS Frequency Hopping (FH) (Net Members)	AIT	BM	1
10. Fixed Bridging	052-197-1130	Identify Bailey Bridge Components	AIT	AN	1
11. Basic Individual Techniques	071-326-0501	Move as a Member of a Fire Team	AIT	QT	1
	071-326-0541	Perform Movement Techniques During MOUT	AIT	QT	1

## CHAPTER 3

### Duty Position Tasks

#### Skill Level 1

#### Subject Area 1: Basic Mine Warfare

#### Locate Mines by Visual Means

**052-192-1021**

**Conditions:** You are given a mission to locate mines by visual means. You are given an area with a possible minefield and different minefield characteristics.

**Standards:** Locate possible mine sites, and visually search suspected areas for mines and trip wires. Ensure that no visible mines, parts of mines, or trip wires are overlooked.

#### Performance Steps

1. Locate possible mine sites by looking at the following areas:
  - a. Avenues of approach.
  - b. Key intersections and turnouts.
  - c. Trails, paths, and cleared spots in wooded areas.
  - d. Approaches and exits to bridges, fords, and tunnels.
  - e. Wood lines.
  - f. Depressions and ditches.
  - g. Open fields or grassland.
2. Search possible mine sites for suspected mines and trip wires by looking at the following areas:
  - a. Damaged vehicles.
  - b. Dead animals.
  - c. Areas avoided by the local population.
  - d. Signs of digging.
  - e. Signs of concrete or asphalt removal.
  - f. Holes or grooves in the road.
  - g. Boxes or parcels placed along the road or shoulder of the road.
  - h. Parked vehicles or bicycles without operators.
  - i. Wire on the road surface or extending onto the shoulder of the road.
  - j. Metallic devices on the road surface or extending onto the shoulder of the road.
  - k. Evidence of vegetation disturbance along the shoulder of the road.
  - l. Evidence of mine-peculiar supplies (such as wrenches, shipping plugs, wrapping paper, and safety collars from fuses).
  - m. Disturbance of road potholes or puddles.
  - n. Difference in the amount of moisture or dew on the road surface.
  - o. Difference in plant growth (such as wilting, changed colors, or dead foliage).
  - p. Disturbance in previous tire tracks.
  - q. Signs posted on trees that covertly alert the local populace to the presence of mines.

**NOTE:** In addition to the above indicators, knowledge and recognition of likely threat mines, intelligence preparation of the battlefield, and plotting of likely ambush sites may also warn of buried mines.

3. Report all suspected areas to the noncommissioned officer in charge (NCOIC).

**Evaluation Preparation:** Setup: Provide a mined or simulated mined and trip-wired area that has the different characteristics listed.

Brief soldier: Tell the soldier to look at the terrain and visually locate mined and trip-wired areas.

**Performance Measures**

**GO**

**NO GO**

1. Located possible mine sites.
2. Searched possible mine sites for suspected mines and trip wires.
3. Reported all suspected areas to the NCOIC.

\_\_\_\_\_

\_\_\_\_\_

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\_\_\_\_\_

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

**References**

**Required**

**Related**

FM 20-32

**Install an M15 Antitank (AT) Mine Using the M624 Fuse**  
**052-192-1105**

**Conditions:** As a combat engineer squad member in a field environment, given an M15 AT mine, an M624 fuse with tilt rod, an M20 arming wrench, G697 silicone grease, sandbags, and an entrenching tool.

**Standards:** Install the M15 AT mine using an M624 fuse, in the proper sequence, without causing the mine to detonate.

**Performance Steps**

1. Inspect the mine (Figure 052-192-1105-1).

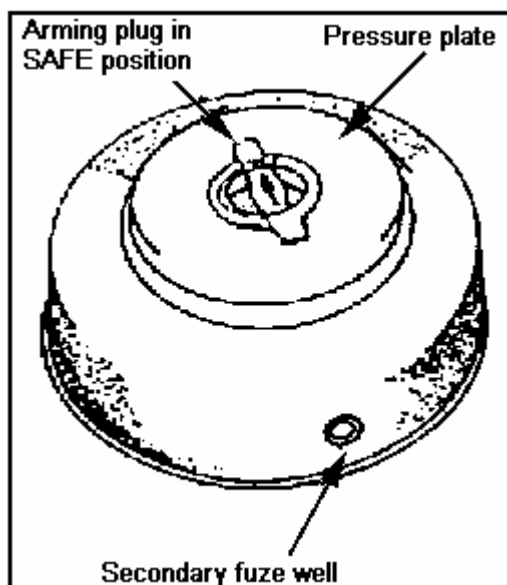


Figure 052-192-1105-1  
M15 AT Mine

**CAUTION:** IF THERE IS A PROBLEM IN ANY OF THE FOLLOWING STEPS, NOTIFY THE NONCOMMISSIONED OFFICER IN CHARGE (NCOIC).

- a. Check to see if the mine is dented, cracked, or damaged. If it is, do not use it.
  - b. Use the M20 arming wrench to unscrew and remove the arming plug from the mine.
  - c. Examine the fuze well for foreign material. If there is foreign material present, turn the mine upside down and gently tap the bottom with your hand to dislodge it. If it cannot be removed, replace the arming plug and do not use the mine.
  - d. Ensure that the booster retainer ring is seated in the fuze well. If the retainer ring is missing, replace the mine.
2. Inspect the fuse.
    - a. Remove the M624 fuse from the metal shipping container and inspect it for serviceability.
    - b. Inspect the plastic collar of the fuse by looking down through the top of the pressure ring (Figures 052-192-1105-2 and 052-192-1105-3).

## Performance Steps

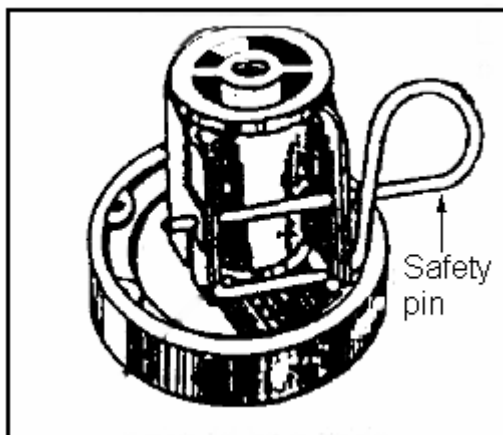


Figure 052-192-1105-2  
Correct Safety-Pin Configuration

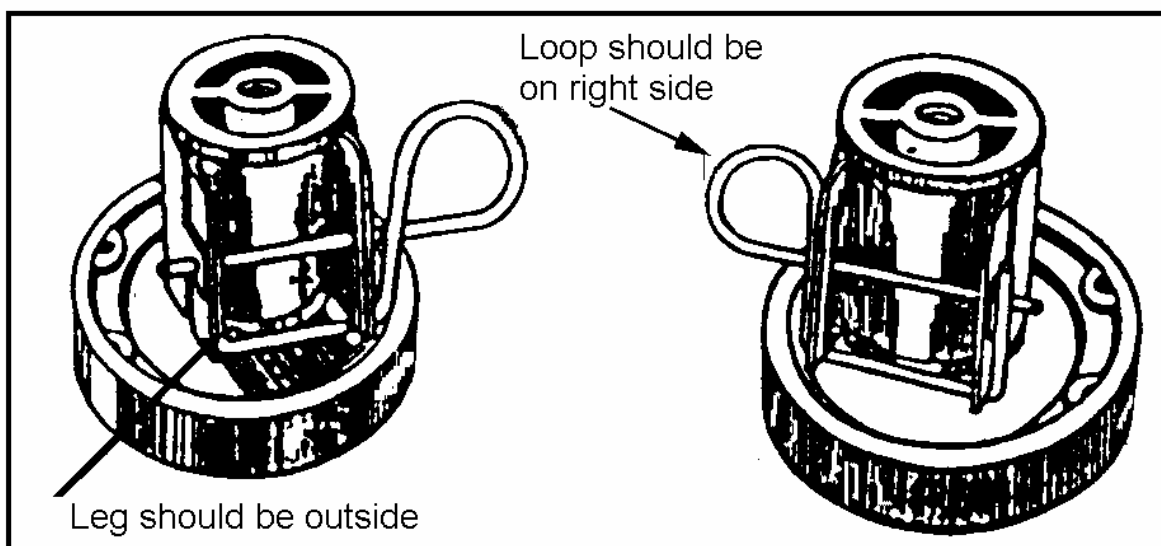


Figure 052-192-1105-3  
Incorrect Safety-Pin Configuration

CAUTION: IF THE SAFETY PIN IS MISSING OR IMPROPERLY ASSEMBLED, DO NOT USE THE FUZE.

CAUTION: DO NOT USE THE FUZE IF THE PLASTIC COLLAR APPEARS TO BE CRACKED.

3. Fuse the mine (Figure 052-192-1105-4).



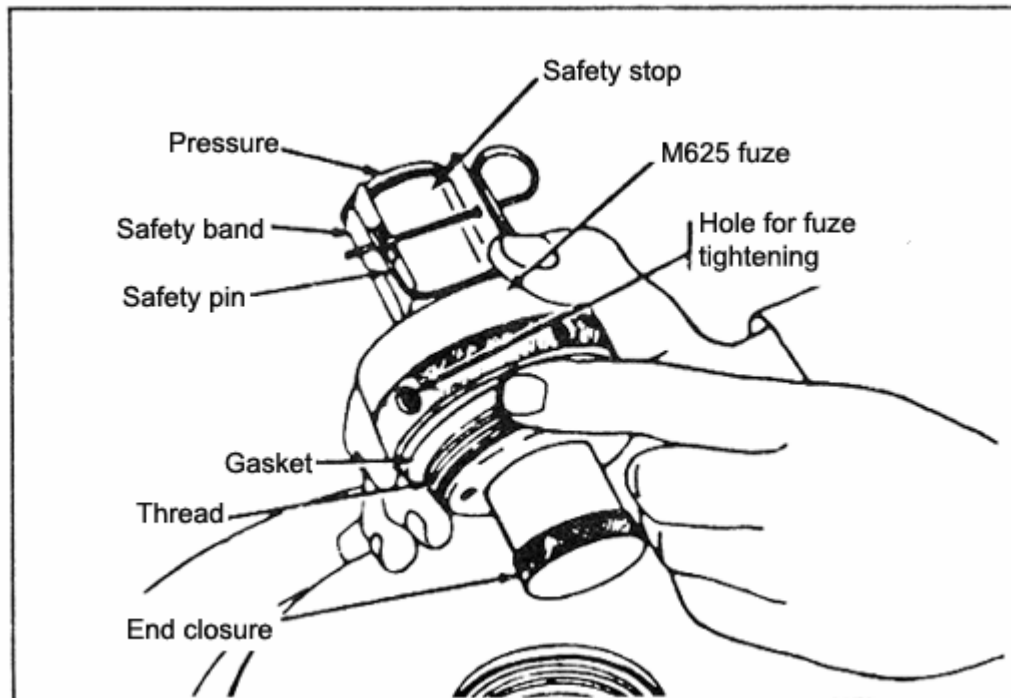
**Performance Steps**

Figure 052-192-1105-4  
Fusing the Mine

NOTE: For long-term emplacement, coat the fuse threads and gasket with silicone grease before removing the end closure.

- a. Unscrew and remove the end closure from the M624 fuze.
- b. Screw the fuze, hand tight, into the threaded fuse well of the M15 AT mine.
- c. Remove the extension rod from its packaging.
- d. Tighten the fuze by inserting the unthreaded end of one extension rod piece into the hole on the side of the fuze. Turn the fuze a quarter turn (Figure 052-192-1105-5).

## Performance Steps

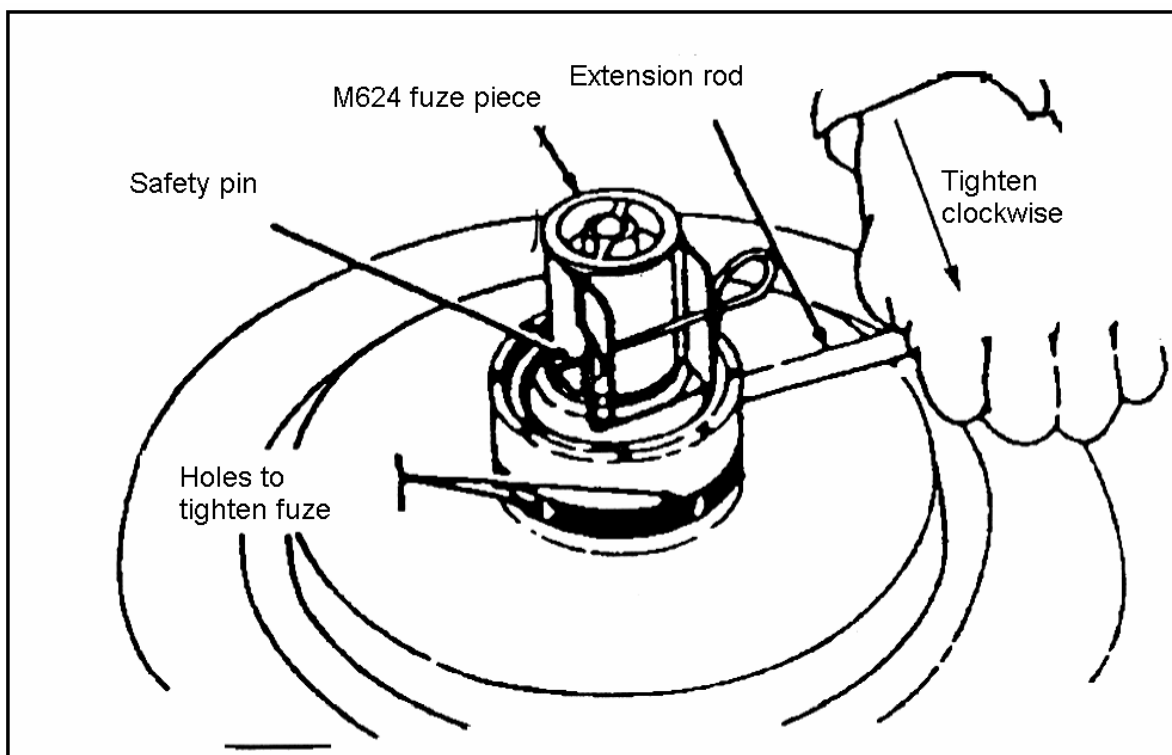


Figure 052-192-1105-5  
Tighten the Fuse With the Extension Rod

- e. Remove the extension rod for further use after the fuse is secure.

NOTE: The M15 AT mine (with the M624 fuze) can be buried or surface laid. If surface laid, it must be staked in place.

4. Dig a hole to fit the mine.
  - a. Dig a hole deep enough so that the top of the pressure plate will be at ground level.
  - b. Dig the sides of the hole at a 45-degree angle to prevent vehicles from bridging the mine.
5. Emplace the mine.
  - a. Place the mine in the hole.
  - b. Cover the mine with 2 centimeters (cm) of soil (Figure 052-192-1105-6).

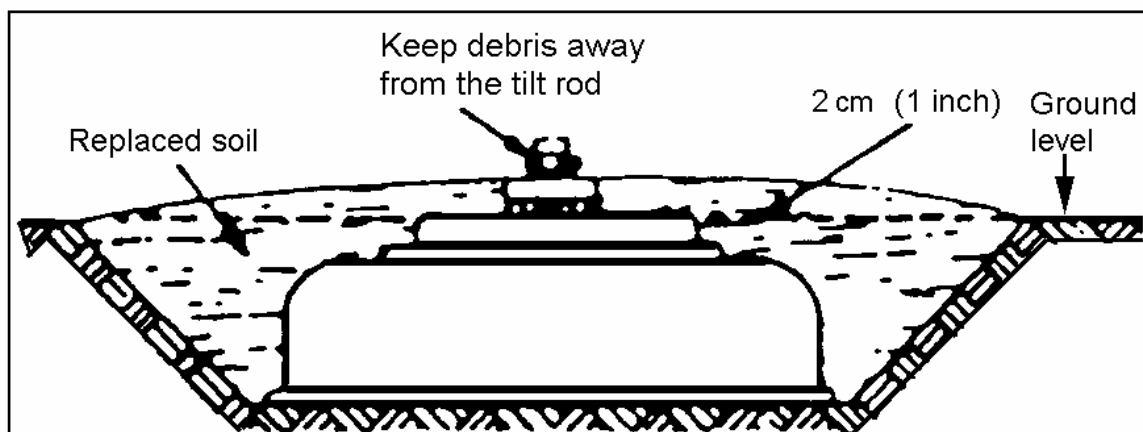
**Performance Steps**

Figure 052-192-1105-6  
M15 AT Mine in Hole

- c. Assemble all three pieces of the extension rod (mines that use a tilt rod) (Figure 052-192-1105-7).

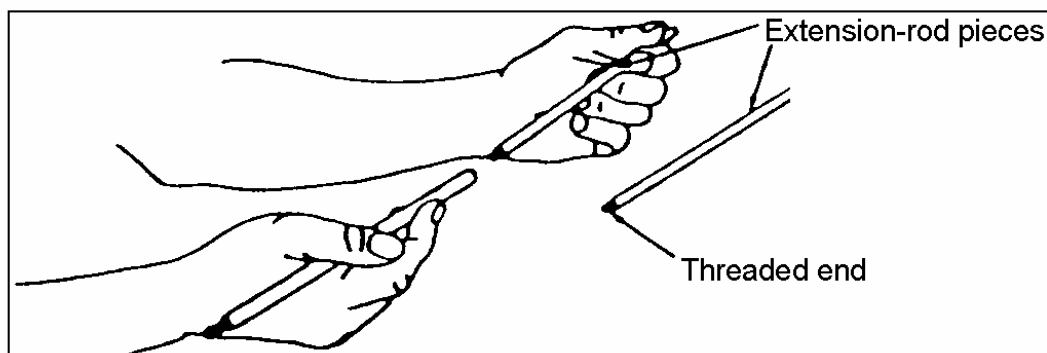


Figure 052-192-1105-7  
Extension-Rod Assembly

- d. Thread the extension rod into the threaded pressure ring of the fuse (mines that use a tilt rod) (Figure 052-192-1105-8).

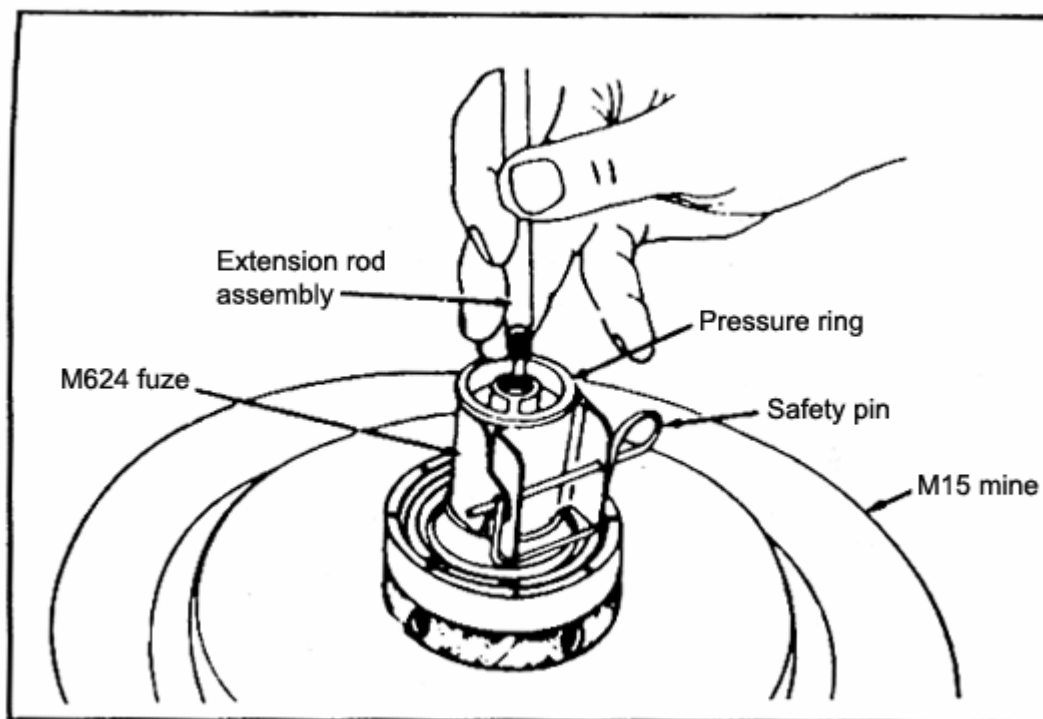
**Performance Steps**

Figure 052-192-1105-8  
Place Assembly of the Extension Rod Into the Fuse Ring

6. Arm the mine.
  - a. Use your right hand to raise the safety pin to the horizontal position. Grasp the safety band and the safety stop with your left hand (Figure 052-192-1105-9).

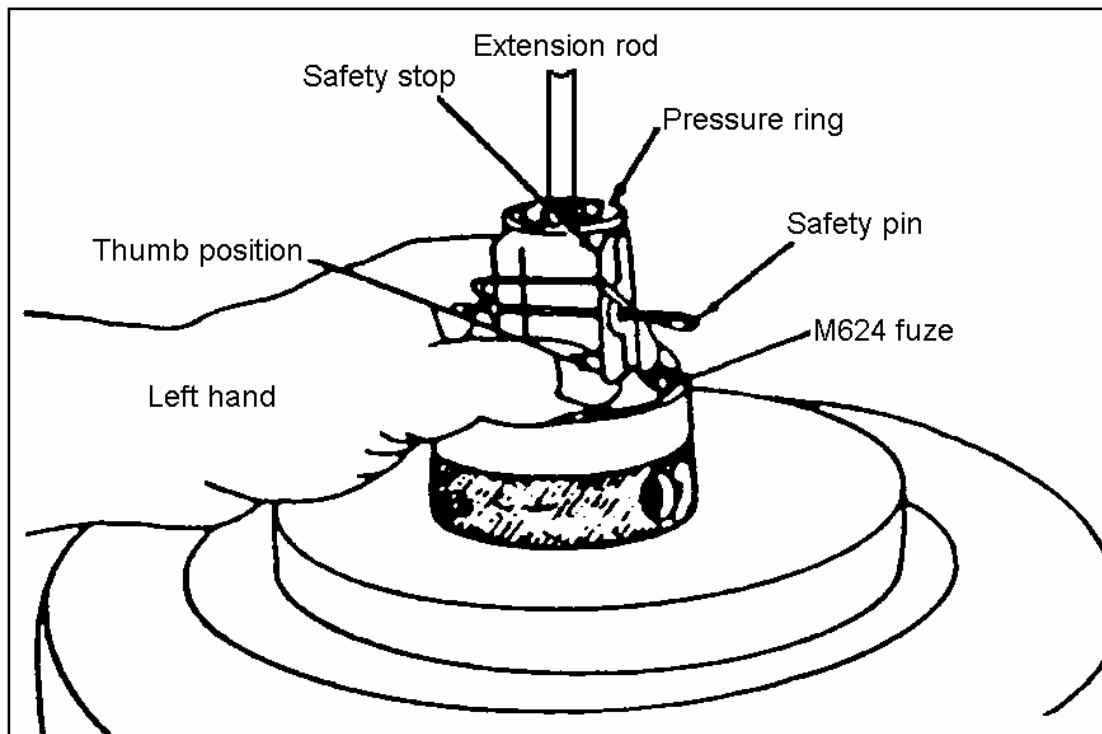
**Performance Steps**

Figure 052-192-1105-9  
Left Hand Grasping the Fuse

- b. Remove the safety pin with your right index finger and pull to the right (Figure 052-192-1105-10).

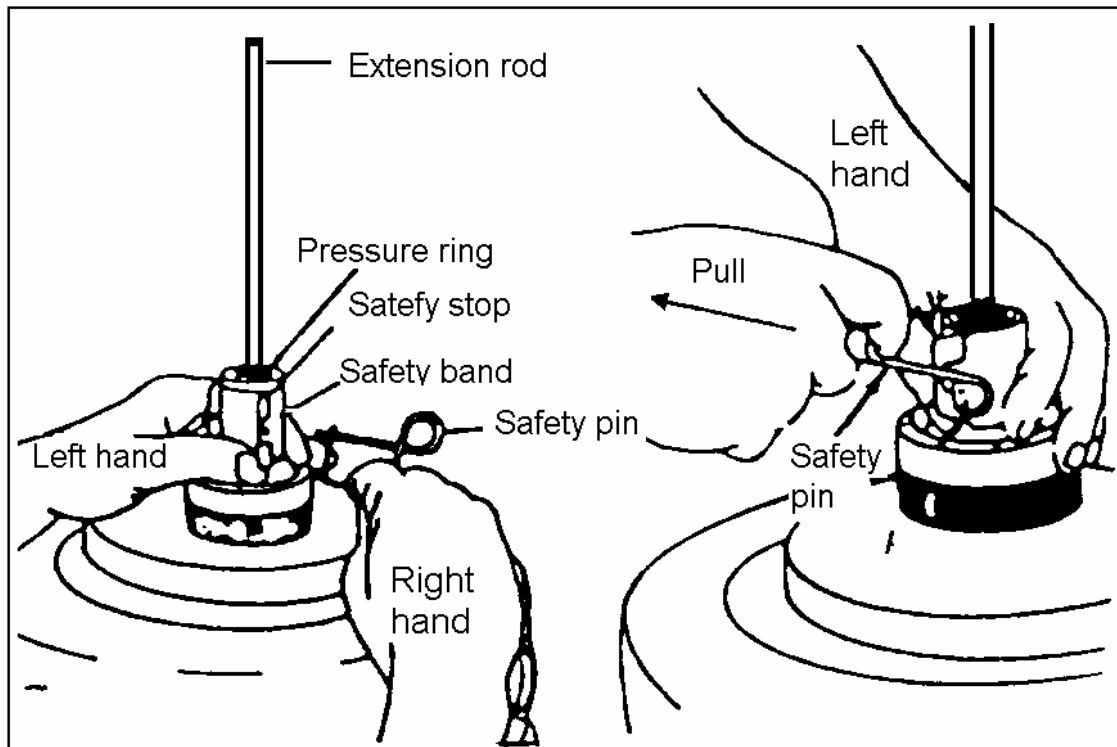
**Performance Steps**

Figure 052-192-1105-10  
Removal of the Safety Pin

- c. Hold the safety band in place and carefully remove the safety stop (Figure 052-192-1105-11).

## Performance Steps

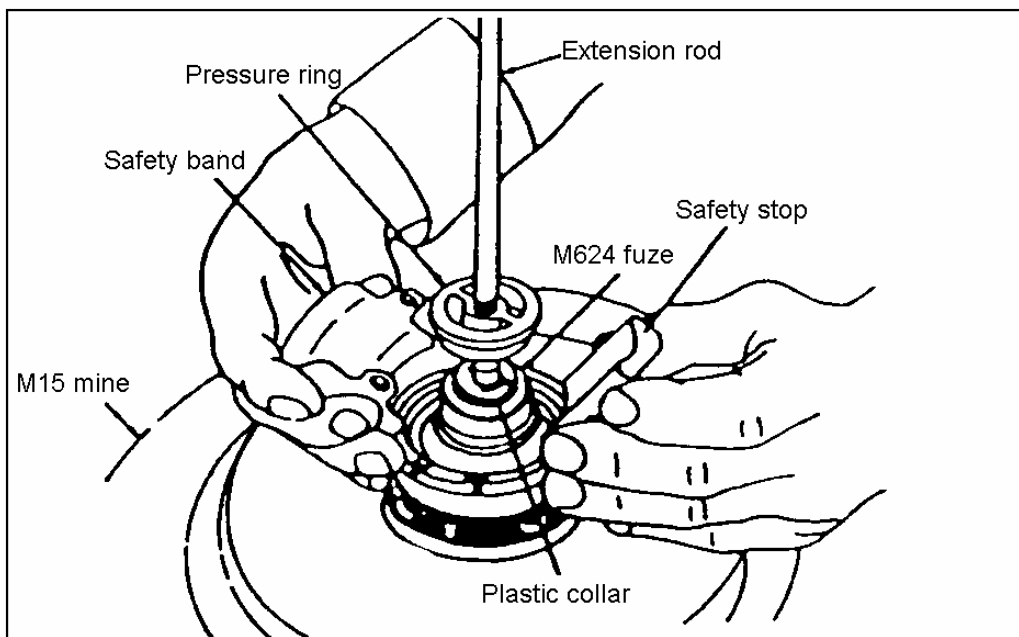


Figure 052-192-1105-11  
Removing the Safety Stop and the Safety Band

- d. Remove the safety band.
7. Camouflage the mine.
  - a. Camouflage the mine with twigs, grass, or other material in the area. Place mines with extension rods in tall grass, if possible. Ensure that no pressure is applied to the tilt rod or the fuse.
  - b. Place excess soil in sandbags and remove them from the area.
  - c. Give the band, the stop, the pull-ring assembly, the arming plug, and the end closure to the NCOIC.

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the condition statement. Use inert equipment when performing this task.

Brief soldier: Observe the soldier's performance for any improper procedures that may cause the mine to detonate.

### Performance Measures

1. Inspected the mine.
2. Inspected the fuse.
3. Fuzzed the mine.
4. Dug a hole to fit the mine.
5. Emplaced the mine.
6. Armed the mine.
7. Camouflaged the mine.

**GO**      **NO GO**

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**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

**References**  
**Required**

**Related**  
FM 20-32  
FM 5-34  
GTA 05-10-036  
GTA 05-10-037  
TM 43-0001-36



**Remove an M15 Antitank (AT) Mine With the M624 Fuse**  
**052-192-1106**

**Conditions:** As a combat engineer squad member in a field environment, given the location of an emplaced M15 AT mine, and armed with an M624 fuse with a tilt rod, a safety clip, a safety band, a safety stop, and an M20 arming wrench.

**Standards:** Remove an M15 AT mine armed with an M624 fuse, in the proper sequence, without causing the mine to detonate.

**Performance Steps**

**WARNING:** BEFORE ATTEMPTING TO DISARM AND REMOVE THE MINE, CHECK FOR BOOBY TRAPS AND DAMAGE OR MALFUNCTIONS TO THE MINE. IF ANY OF THESE CONDITIONS EXIST, NOTIFY THE NONCOMMISSIONED OFFICER IN CHARGE (NCOIC). DO NOT ATTEMPT TO DISARM THE MINE.

1. Disarm the mine.

**WARNING:** DO NOT APPLY PRESSURE TO THE TILT ROD OR FUZE AT ANY TIME.

- a. Clear the camouflage away from the mine.
- b. Assemble the safety band and safety stop on the fuse so that the pressure ring is immobilized (Figure 052-192-1106-1).

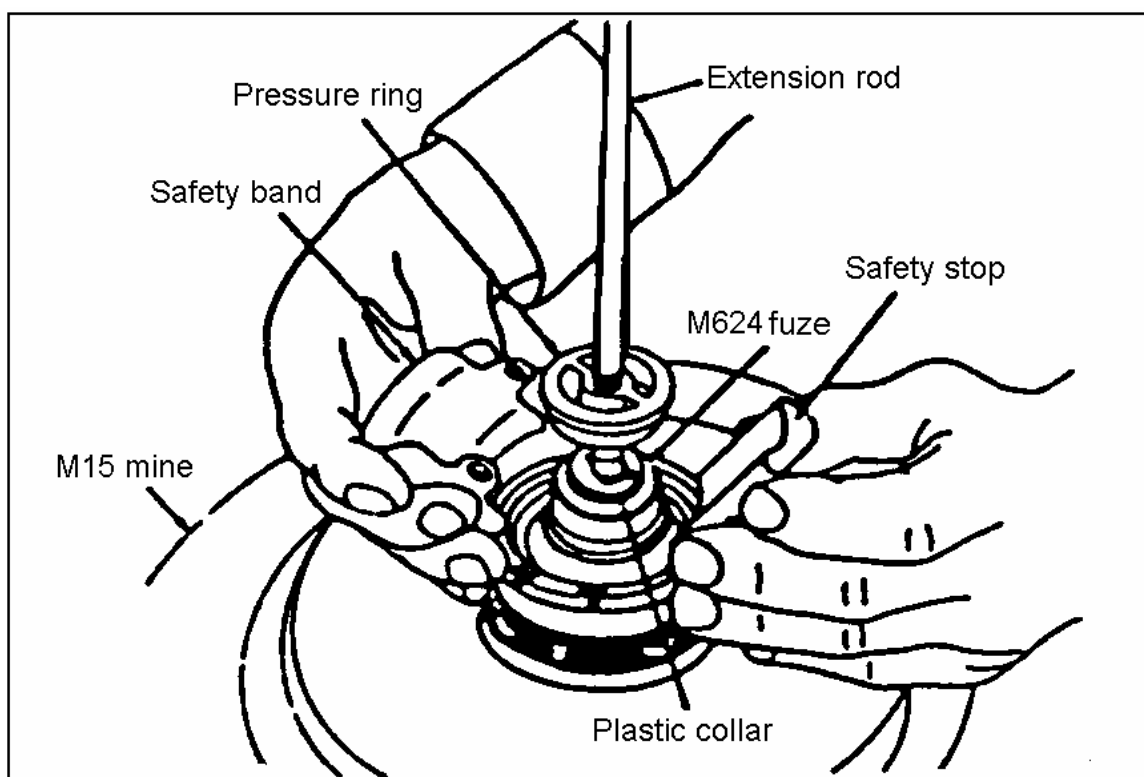


Figure 052-192-1106-1  
Safety-Band and Safety-Stop Installation

- c. Install the safety pin while holding the safety band and the safety stop (Figure 052-192-1106-2 and Figure 052-192-1106-3).

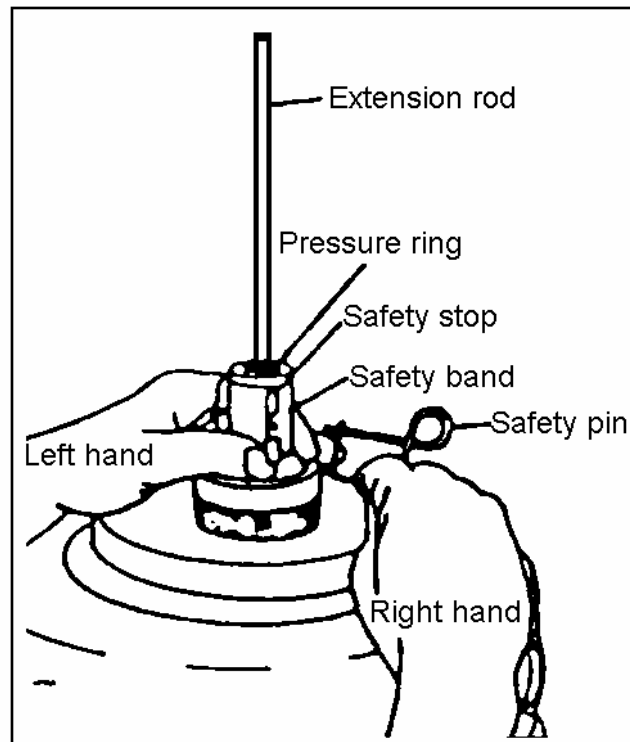
**Performance Steps**

Figure 052-192-1106-2  
Safety-Pin Installation

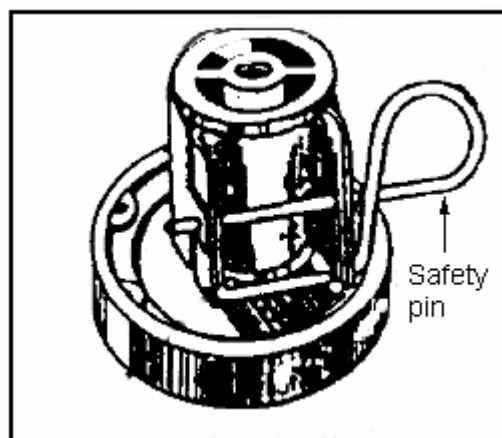


Figure 052-192-1106-3  
Correct Safety-Pin Configuration

NOTE: Ensure that the safety pin is replaced correctly.  
d. Unscrew and remove the extension rod.

**Performance Steps**

2. Check for antihandling devices (AHDs).
  - a. Hold the mine firmly in place with one hand without putting pressure on the fuse.
  - b. Feel for AHDs by digging around and underneath the mine with the other hand.
3. Remove the mine.
  - a. Remove the mine from the hole.
  - b. Remove the fuse from the mine. Use the extension rod, if necessary.
  - c. Replace the end closure on the fuse.
  - d. Install the arming plug in the fuse well of the mine.

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions statement. Use inert equipment when performing this task.

Brief soldier: Observe the soldier's performance for any improper procedures that may cause the mine to detonate.

<b>Performance Measures</b>	<b><u>GO</u></b>	<b><u>NO GO</u></b>
1. Disarmed the mine	_____	_____
2. Checked for AHDs.	_____	_____
3. Removed the mine	_____	_____

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

**References**  
**Required**

**Related**  
 FM 20-32  
 FM 5-34  
 TM 43-0001-36

## Install an M15 Antitank (AT) Mine Using the M603 Fuse 052-192-1107

**Conditions:** As a combat engineer squad member in a field environment, given an M15 AT mine, an M603 fuse, an M20 arming wrench, G697 silicone grease, sandbags, and an entrenching tool.

**Standards:** Install an M15 AT mine with an M603 fuse, in the proper sequence, without causing the mine to detonate.

### Performance Steps

1. Inspect the mine.

**CAUTION:** IF THERE IS A PROBLEM IN ANY OF THE FOLLOWING STEPS, NOTIFY THE NONCOMMISSIONED OFFICER IN CHARGE (NCOIC).

- a. Check to see if the mine is dented, cracked, or damaged. If it is, do not use it.
- b. Use the M20 wrench, if needed, to unscrew and remove the arming plug from the mine (Figure 052-192-1107-1).

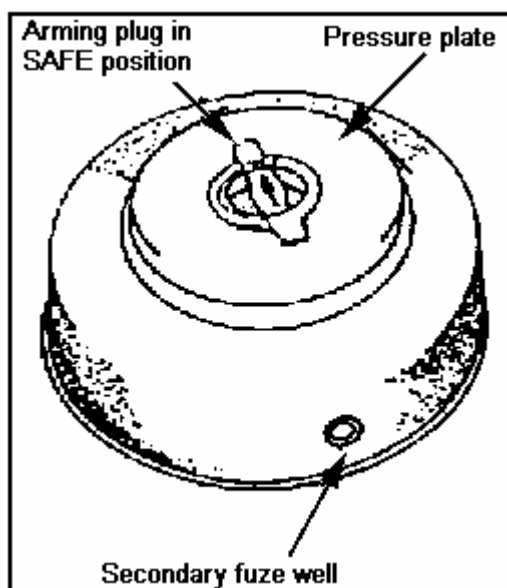


Figure 052-192-1107-1  
M15 AT Mine

- c. Examine the fuse well for foreign material. If foreign material is present, remove it by turning the mine upside down and lightly shaking the mine.

**NOTE:** If the material cannot be removed, replace the arming plug and do not use the mine.

- d. Ensure that the booster retainer ring is seated in the fuse well. If the retainer ring is missing, replace the mine.
2. Perform a function check with the arming plug.
    - a. Turn the setting knob to the ARMED (A) position. Ensure that the shutter bar moves across the bottom of the arming plug (Figure 052-192-1107-2).

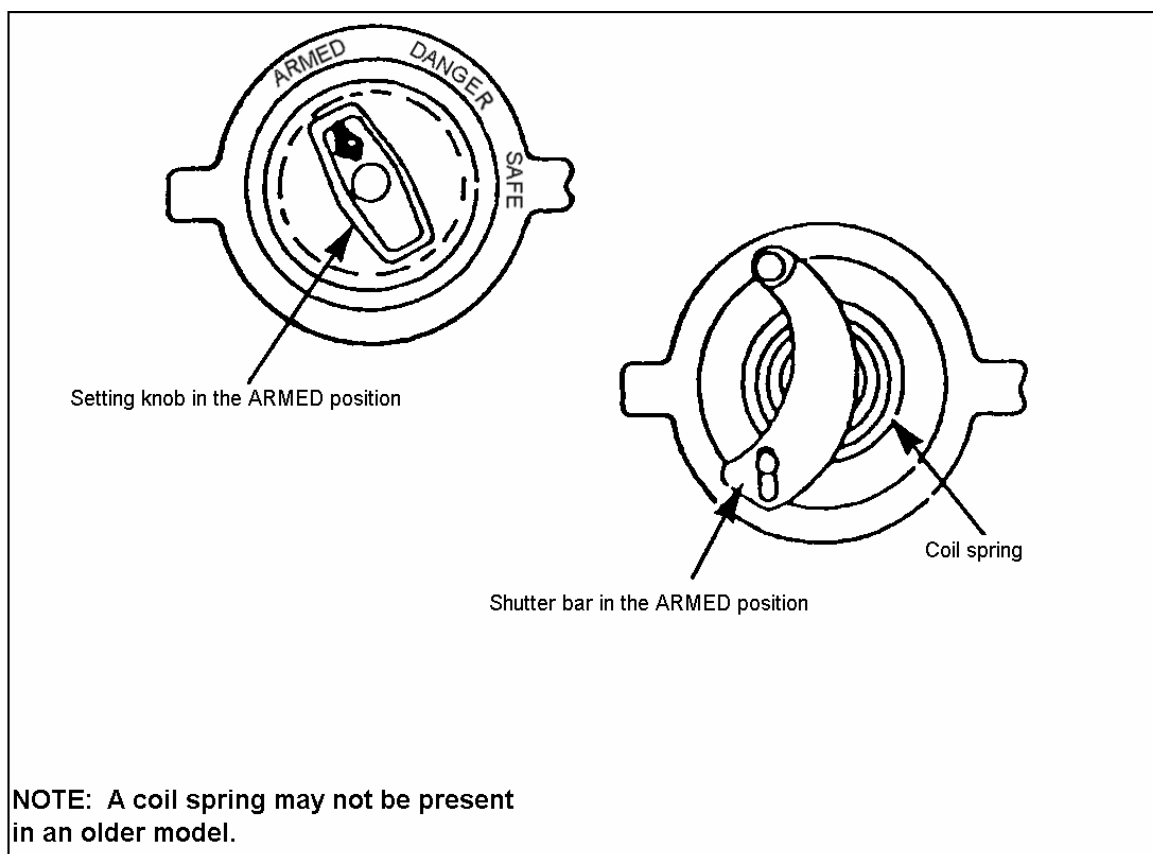
**Performance Steps**

Figure 052-192-1107-2  
ARMED Position

- b. Turn the setting knob to the SAFE (S) position. Ensure that the shutter bar moves back across the bottom of the arming plug (Figure 052-192-1107-3).

## Performance Steps

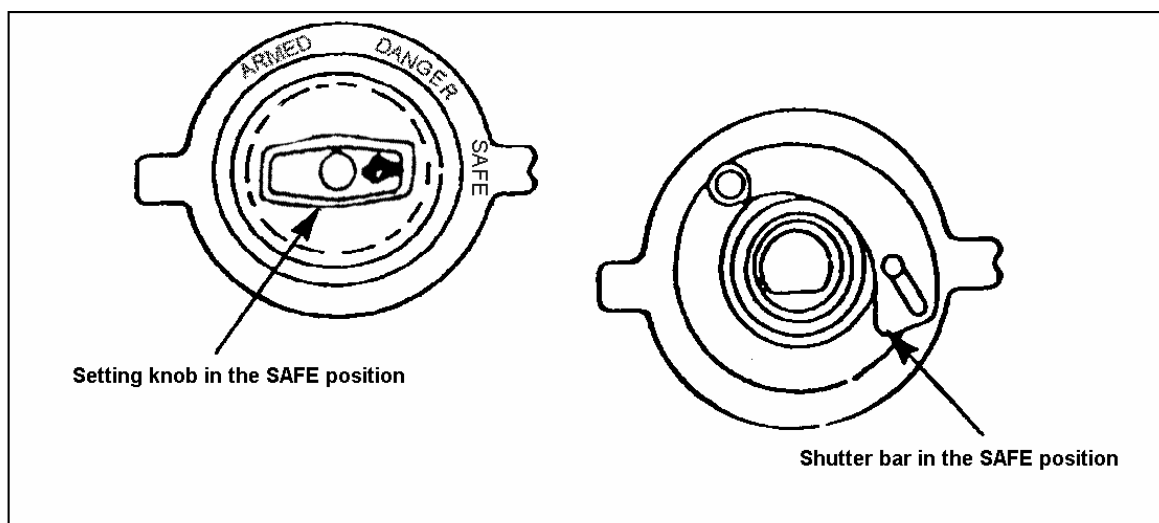


Figure 052-192-1107-3  
SAFE Position

NOTE: If the shutter bar does not go into the SAFE or ARMED position, notify the NCOIC.

### 3. Fuse the mine.

CAUTION: ENSURE THAT THE SAFETY FORK MOVES FREELY. IF THERE IS PRESSURE ON THE FORK, DO NOT REMOVE IT. NOTIFY THE NCOIC.

- a. Remove the M603 fuse from its metal shipping container and inspect it for damage. The varnish or painted lining must show on the bottom of the fuse.

NOTE: For long-term emplacement, coat the fuse with silicone grease G697. Also, smear grease on the threads and walls of the fuse well.

- b. Use the hooked end of the M20 wrench to remove the safety fork of the M603 fuse. Retain the safety fork for future use (Figure 052-192-1107-4).

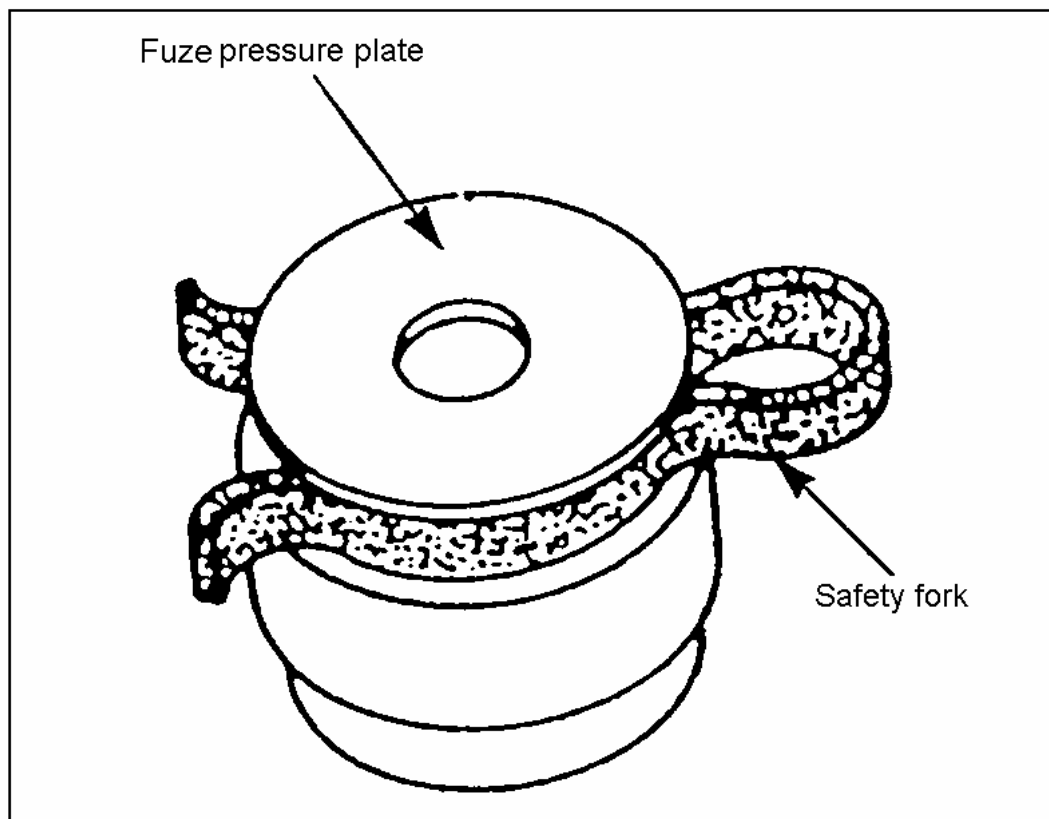
**Performance Steps**

Figure 052-192-1107-4  
Safety Fork

**WARNING: DO NOT APPLY PRESSURE TO THE PRESSURE PLATE OF THE FUZE AT ANY TIME.**

- c. Insert the fuze into the fuze well until it seats securely on top of the booster-retaining ring.
- d. Use the M20 arming wrench to perform a clearance check (Figure 052-192-1107-5). Insert the tab end of the arming wrench into the fuze well and move it back and forth to ensure that the tab end does not touch the fuze.

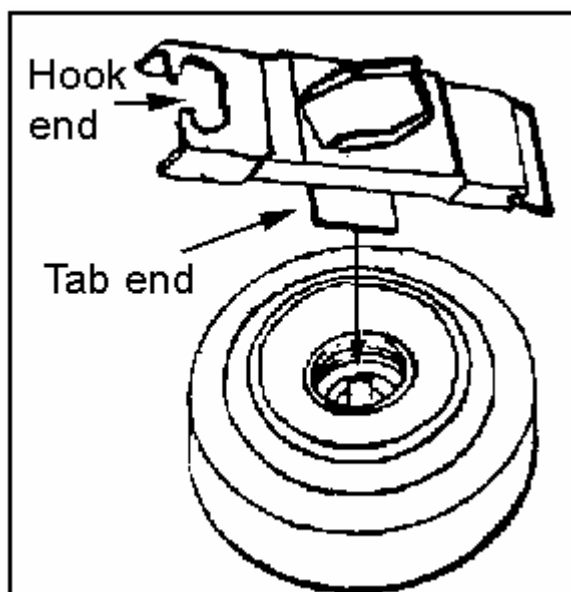
**Performance Steps**

Figure 052-192-1107-5  
Fuse Clearance Check

**WARNING:** IF THE FUZE PRESSURE PLATE INTERFERES WITH THE TAB END OF THE M20 ARMING WRENCH, INVESTIGATE THE CAUSE AND NOTIFY THE NCOIC. DO NOT ARM THE MINE.

4. Install the arming plug.

**NOTE:** For long-term emplacement, smear silicone grease G697 on the threads, the gasket, and the shutter on the underside of the arming plug.

- a. Ensure that the setting knob is in the SAFE position.
- b. Screw the arming plug into the mine by hand. Ensure that there is a watertight seal by using the M20 arming wrench to tighten the arming plug.

5. Dig a hole deep enough to fit the mine.

- a. Dig a hole deep enough so that when the mine is placed into it, the top of the pressure plate is about 1 1/2 inches below ground level.
- b. Dig the sides of the hole at a 45-degree angle to prevent vehicles from bridging the mine (Figure 052-192-1107-6).



## Performance Steps

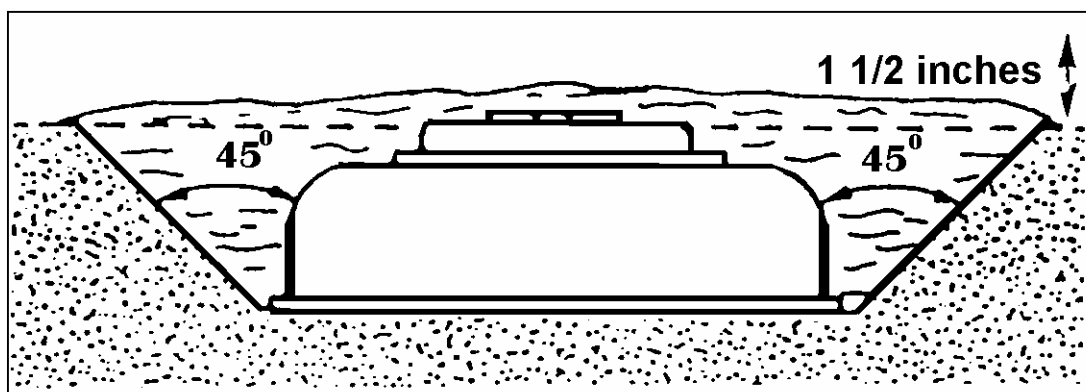


Figure 052-192-1107-6  
M15 AT Mine in the Hole

6. Emplace the mine.
  - a. Put the mine in the hole.
  - b. Cover the mine with soil until it is level with the top of the pressure plate.
7. Use the M20 arming wrench to arm the mine. Turn the setting knob from the SAFE to the ARMED position.
8. Camouflage the mine.
  - a. Cover the mine with 1 to 2 inches of soil.
  - b. Camouflage the mine. Place the excess soil in sandbags and remove them from the area.
  - c. Give the safety fork to the NCOIC.

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions statement. Use inert equipment when performing this task.

Brief soldier: Observe the soldier's performance for any improper procedures that may cause the mine to detonate.

## Performance Measures

1. Inspected the mine.
2. Performed a function check with the arming plug.
3. Fuzzed the mine.
4. Installed the arming plug.
5. Dug a hole deep enough to fit the mine.
6. Emplaced the mine.
7. Used the M20 arming wrench to arm the mine.
8. Camouflaged the mine.

**GO**      **NO GO**

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

**References  
Required**

**Related**  
FM 20-32  
FM 5-34  
TM 43-0001-36

## Remove an M15 Antitank (AT) Mine Using the M603 Fuse 052-192-1108

**Conditions:** As a combat engineer squad member in a field environment, given the location of an emplaced M15 AT mine armed with an M603 fuse, a safety fork, and an M20 arming wrench.

**Standards:** Remove an M15 AT mine armed with an M603 fuse, in the proper sequence, without causing the mine to detonate.

### Performance Steps

**WARNING:** BEFORE ATTEMPTING TO DISARM AND REMOVE THE MINE, CHECK FOR BOOBY TRAPS, DAMAGE, OR MALFUNCTIONS TO THE MINE. IF ANY OF THESE CONDITIONS EXIST, STOP AND NOTIFY THE NONCOMMISSIONED OFFICER IN CHARGE (NCOIC). DO NOT ATTEMPT TO DISARM THE MINE.

1. Disarm the mine.

**WARNING:** DO NOT APPLY PRESSURE TO THE PRESSURE PLATE AT ANY TIME.

- a. Clear the soil from the top of the mine.
- b. Hold the mine firmly in place with one hand. Do not put pressure on the pressure plate.
- c. Feel for antihandling devices (AHDs), with the other hand, by digging around the sides and underneath the mine.

**WARNING:** IF YOU FIND AN AHD, STOP AND NOTIFY THE NCOIC. DO NOT REMOVE THE MINE.

- d. Use the M20 arming wrench to turn the setting knob to the SAFE (S) position (Figure 052-192-1108-1).

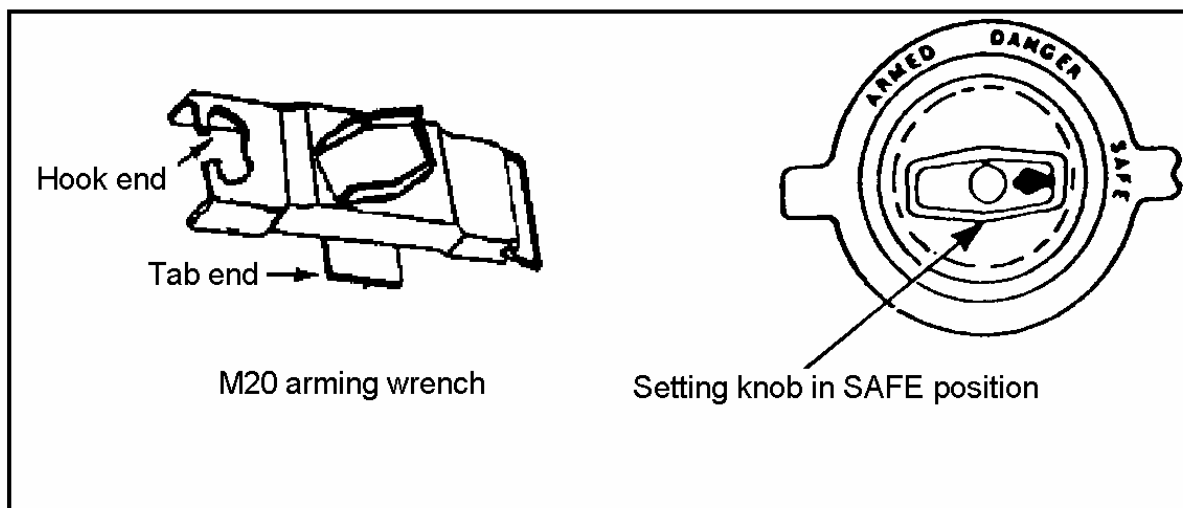


Figure 052-192-1108-1  
M20 Arming Wrench and the Setting Knob

**WARNING:** IF THE SETTING KNOB IS DIFFICULT TO TURN, STOP; DO NOT FORCE IT. NOTIFY THE NCOIC.

2. Remove the mine
  - a. Remove the mine from the hole.
  - b. Use the M20 arming wrench to turn the arming plug counterclockwise to remove the plug.
  - c. Remove the M603 fuse from the fuse well and replace the safety fork on the fuse.
  - d. Install the arming plug.

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions statement. Use inert equipment when performing this task.

Brief soldier: Observe the soldier's performance for any improper procedures that may cause the mine to detonate.

**Performance Measures**

**GO**    **NO GO**

1. Disarmed the mine.

\_\_\_\_\_

2. Removed the mine.

\_\_\_\_\_

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

**References**

**Required**

**Related**

FM 20-32

FM 5-34

GTA 05-10-036

GTA 05-10-037

TM 43-0001-36

**Install an M19 Antitank (AT) Mine**  
**052-192-1109**

**Conditions:** As a combat engineer squad member in a field environment, given an M19 AT mine, an M50 detonator, an M22 arming wrench, an entrenching tool, G697 silicone grease, and sandbags.

**Standards:** Install an M19 AT mine, in the proper sequence, without detonating the mine.

**Performance Steps**

1. Inspect the mine.

**CAUTION:** IF THERE IS A PROBLEM IN ANY OF THE FOLLOWING STEPS, NOTIFY THE NONCOMMISSIONED OFFICER IN CHARGE (NCOIC).

- a. Check to see if the mine is dented, cracked, or damaged. If it is, do not use it.
- b. Use the M22 wrench to remove the M606 fuse from the fuse well by turning it counterclockwise one-quarter turn (Figures 052-192-1109-1 and 052-192-1109-2).

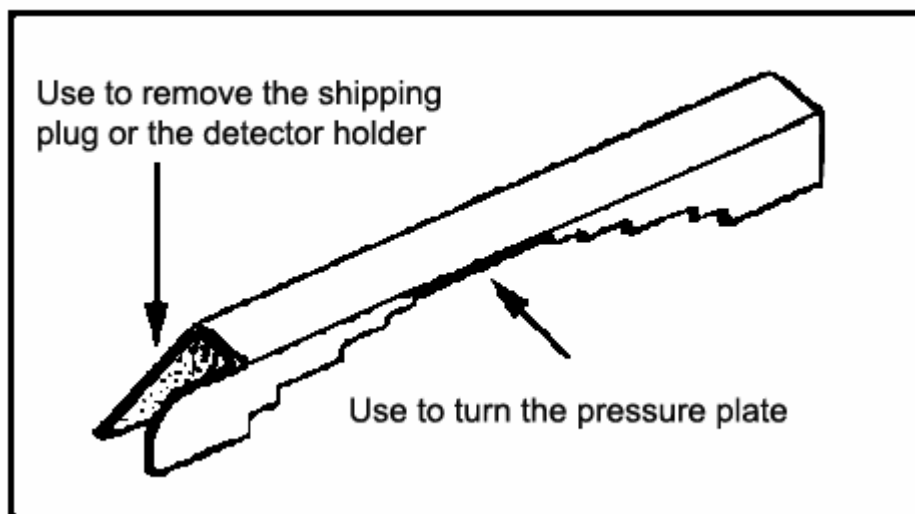


Figure 052-192-1109-1  
M22 Arming Wrench

- c. Ensure that the rubber gasket is on the M606 fuse.

## Performance Steps

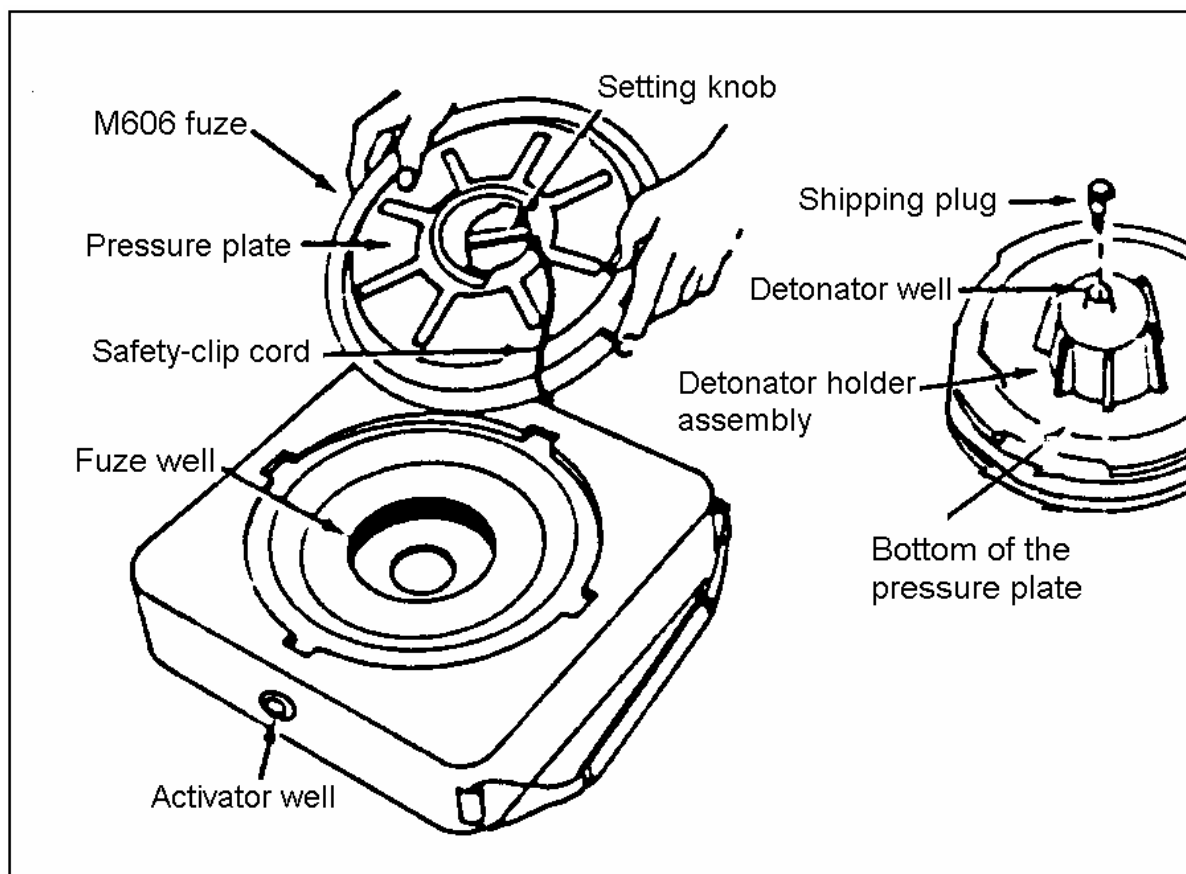


Figure 052-192-1109-2  
Pressure-Plate Removal

- d. Remove any foreign material found in the fuze well.
- e. Ensure that the setting knob is in the SAFE (S) position and that the safety clip is in place.
- f. Use the M22 wrench, if needed, to remove the shipping plug from the detonator well. Retain the shipping plug.
- g. Examine the detonator well for foreign material. If foreign material is present, remove it by turning the fuze upside down and tapping it lightly on the side.

NOTE: The activator well is to be used with the M142 multipurpose firing device.

2. Test the firing pin position (Figure 052-192-1109-3).

## Performance Steps

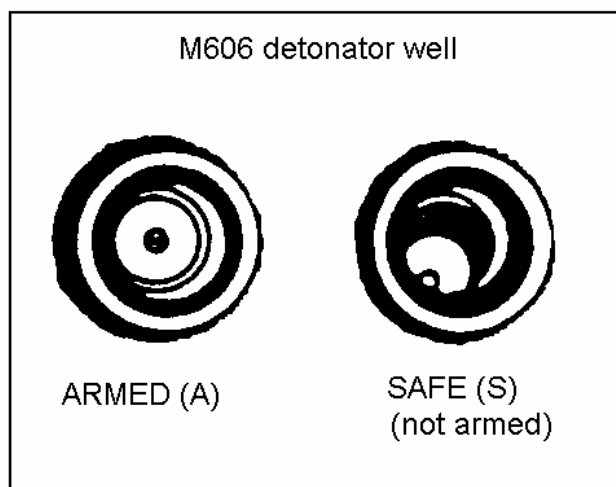


Figure 052-192-1109-3  
Firing Pin Positions

**WARNING: DO NOT ADJUST THE SETTING KNOB WHILE THE DETONATOR IS IN THE DETONATOR WELL.**

- a. Look at the firing pin's position. Ensure that the firing pin is at the edge of the well when the setting knob is in the SAFE (S) position.

**NOTE:** If the pin is in the middle of the well, notify the NCOIC.

- b. Remove the safety clip.
- c. Use the M22 wrench to turn the setting knob to the ARMED (A) position. Ensure that the firing pin is in the center of the well.
- d. Use the M22 wrench to turn the setting knob back to the SAFE (S) position. Ensure that the firing pin moves back to the side of the well.

**NOTE:** If the firing pin is not in the correct position when the setting knob is in either the ARMED (A) or the SAFE (S) position, notify the NCOIC.

- e. Replace the safety clip.

3. Place the M50 detonator into the detonator well.

**NOTE:** For long-term emplacement, smear G697 silicone grease on the top of the detonator, the detonator holder, and the threaded portion of the detonator holder.

4. Use the M22 wrench to tighten the M606 fuse into the fuse well.

**NOTE:** For long-term emplacement, smear G697 silicone grease on the fuse gasket.

5. Dig a hole to fit the mine.

- a. Dig a hole deep enough so the top of the pressure plate is even or slightly below ground level.
- b. Dig the sides of the hole at a 45-degree angle to prevent vehicles from bridging the mine.

6. Emplace the mine.

- a. Put the mine in the hole.

**Performance Steps**

- b. Cover the mine with soil until it is level with the top of the pressure plate, leaving the setting knob exposed.
7. Arm the mine.
  - a. Remove the safety clip.
  - b. Use the M22 wrench to turn the setting knob from the SAFE (S) to the ARMED (A) position.
8. Camouflage the mine.
  - a. Cover the mine with 1 to 2 inches of soil.
  - b. Camouflage the mine. Place the excess soil in sandbags and remove them from the area.
  - c. Give the safety clip and shipping plug to the NCOIC.

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions statement. Use inert equipment when performing this task.

Brief soldier: Observe the soldier's performance for any improper procedures that may cause the mine to detonate.

**Performance Measures**

	<u><b>GO</b></u>	<u><b>NO GO</b></u>
1. Inspected the mine.	_____	_____
2. Tested the firing pin position.	_____	_____
3. Placed the M50 detonator into the detonator well.	_____	_____
4. Used the M22 wrench to tighten the M606 fuse into the fuse well.	_____	_____
5. Dug a hole to fit the mine.	_____	_____
6. Emplaced the mine.	_____	_____
7. Armed the mine.	_____	_____
8. Camouflaged the mine.	_____	_____

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

**References****Required****Related**

FM 20-32  
 FM 5-34  
 GTA 05-10-036  
 GTA 05-10-037  
 TM 43-0001-36



## Remove an M19 Antitank (AT) Mine

### 052-192-1110

**Conditions:** As a combat engineer squad member in a field environment, given the location of an emplaced M19 AT mine, an M22 arming wrench, a safety clip, and a shipping plug.

**Standards:** Remove an M19 AT mine, in the proper sequence, without causing the mine to detonate.

#### Performance Steps

**WARNING:** BEFORE ATTEMPTING TO DISARM AND REMOVE THE MINE, CHECK FOR BOOBY TRAPS, DAMAGE, OR MALFUNCTIONS. IF ANY OF THESE CONDITIONS EXIST, NOTIFY THE NONCOMMISSIONED OFFICER IN CHARGE (NCOIC). DO NOT ATTEMPT TO DISARM THE MINE.

1. Disarm the mine.

**WARNING:** DO NOT APPLY PRESSURE TO THE PRESSURE PLATE AT ANY TIME.

- a. Clear the soil from the top of the mine.
- b. Hold the mine firmly in place with one hand. Do not put pressure on the pressure plate.
- c. Feel for antihandling devices (AHDs), with the other hand, by digging around the sides and underneath the mine.

**WARNING:** IF YOU FIND AN AHD, STOP AND NOTIFY THE NCOIC. DO NOT REMOVE THE MINE.

- d. Use the M22 wrench to turn the setting knob to the SAFE (S) position.

**WARNING:** IF THE SETTING KNOB IS DIFFICULT TO TURN, DO NOT FORCE IT. NOTIFY THE NCOIC.

- e. Replace the safety clip on the M606 fuse.

2. Remove the mine.

- a. Remove the mine from the hole.
- b. Use the M22 wrench to remove the M606 fuse. Turn the wrench counterclockwise and lift the fuse out of the fuse well.
- c. Remove the detonator holder assembly from the well.
- d. Replace the shipping plug in the detonator well.
- e. Replace the pressure plate in the mine.

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions statement. Use inert equipment when performing this task.

**Brief soldier:** Observe the soldier's performance for any improper procedures that may cause the mine to detonate.

#### Performance Measures

1. Disarmed the mine.
2. Removed the mine.

**GO**    **NO GO**

\_\_\_\_    \_\_\_\_  
\_\_\_\_    \_\_\_\_

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

#### References Required

**Related**  
FM 20-32  
FM 5-34  
GTA 05-10-036  
GTA 05-10-037  
TM 43-0001-36

**Install an M21 Antitank (AT) Mine**  
**052-192-1117**

**Conditions:** As a combat engineer squad member in a field environment, given an M21 AT mine, an M120 booster, an M607 fuse, an M26 arming wrench, an entrenching tool, G697 silicone grease, and sandbags.

**Standards:** Install an M21 AT mine, in the proper sequence, without causing the mine to detonate.

**Performance Steps**

1. Inspect the mine and components.

**CAUTION:** IF THERE IS A PROBLEM IN ANY OF THE FOLLOWING STEPS, NOTIFY THE NONCOMMISSIONED OFFICER IN CHARGE (NCOIC).

- a. Check to see if the mine is dented, cracked, or damaged. If it is, do not use it.
- b. Ensure that there is no obvious damage to the M607 fuse. Remove the closure cap and, while keeping your hand clear, inspect the fuse assembly by removing the D ring (cotter pin) and stop band to ensure that the plastic collar is intact. Rotate the fuse around the U band in a 360-degree circle, inspecting the entire fuse (Figure 052-192-1117-1).

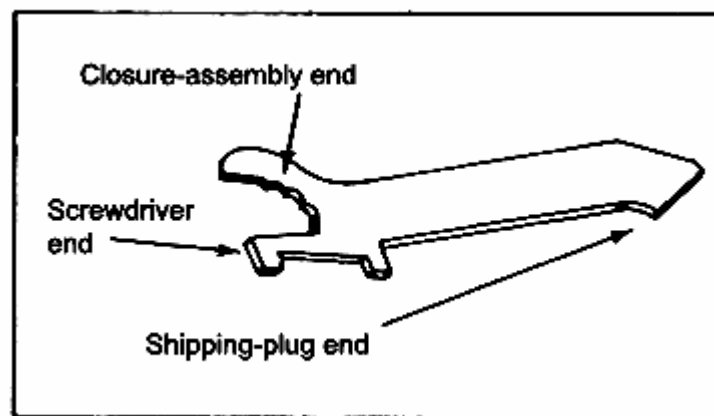


Figure 052-192-1117-1  
M607 Fuse

- c. Replace the stop band, D ring, and closure cap.

**CAUTION:** IF THE TOP OF THE FUZE TURNS WITH THE STOP AND BAND, THE NECK OF THE FUZE IS BROKEN.

2. Insert the booster.
  - a. Turn the mine upside down. Use the screwdriver end of the M26 wrench to remove the closing plug from the bottom of the mine by turning the plug counterclockwise (Figure 052-192-1117-2).

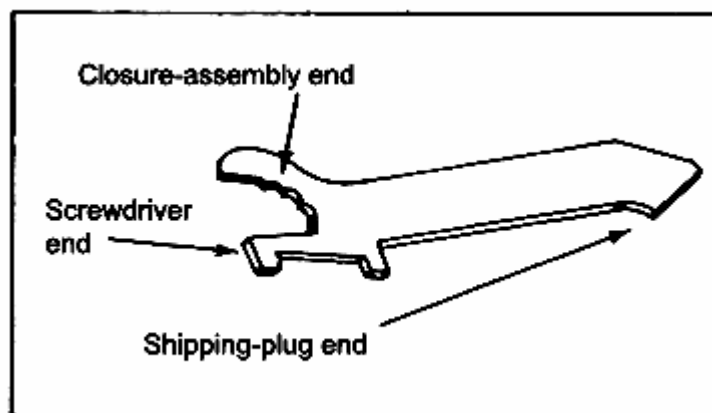
**Performance Steps**

Figure 052-192-1117-2  
M26 Wrench

- b. Examine the booster well for foreign material. If foreign material is present, gently tap the side of the mine with your hand to dislodge it.

**CAUTION: IF THE FOREIGN MATERIAL CANNOT BE REMOVED, REPLACE THE CLOSING PLUG. DO NOT USE THE MINE.**

- c. Insert the M120 booster, with the washer side toward the fuse, into the booster well.
- d. Use the M26 wrench to replace the closure plug, with the gasket side toward the booster, and turn clockwise.

**NOTE:** For long-term emplacement, smear G697 silicone grease on the threads of the closing-plug assembly.

3. Fuse the mine.
  - a. Turn the mine over. Use the M26 wrench to remove the shipping plug from the fuse well on top of the mine (Figure 052-192-1117-3).

## Performance Steps

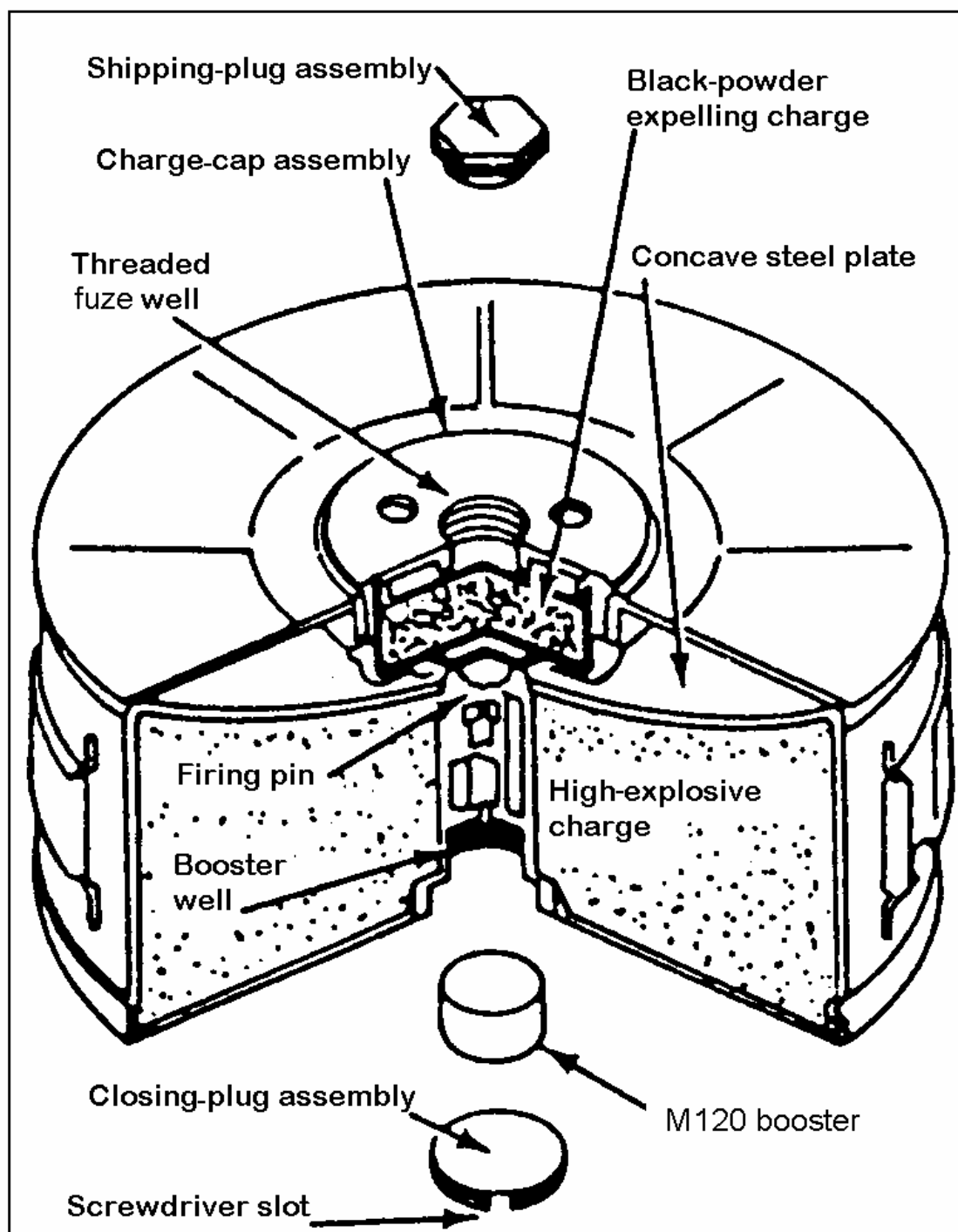


Figure 052-192-1117-3  
View of M21 AT Mine

- b. Examine the fuse well for foreign material. If foreign material is present, gently shake the mine to dislodge it.

**CAUTION:** IF THE FOREIGN MATERIAL CANNOT BE REMOVED, DO NOT USE THE MINE.

**Performance Steps**

- c. Use the M26 wrench to remove the closure assembly from the M607 fuse. Ensure that the gasket remains in place on the fuse.
- d. Screw the fuse, hand tight, into the fuse well and set the mine to the side.

NOTE: For long-term emplacement, smear G697 silicone grease on the fuse threads.

- 4. Dig a hole to fit the mine.

NOTE: Mines with extension rods should be placed in tall grass, if possible.

- a. Dig a hole deep enough so that the top of the mine will be at ground level (Figure 052-192-1117-4).

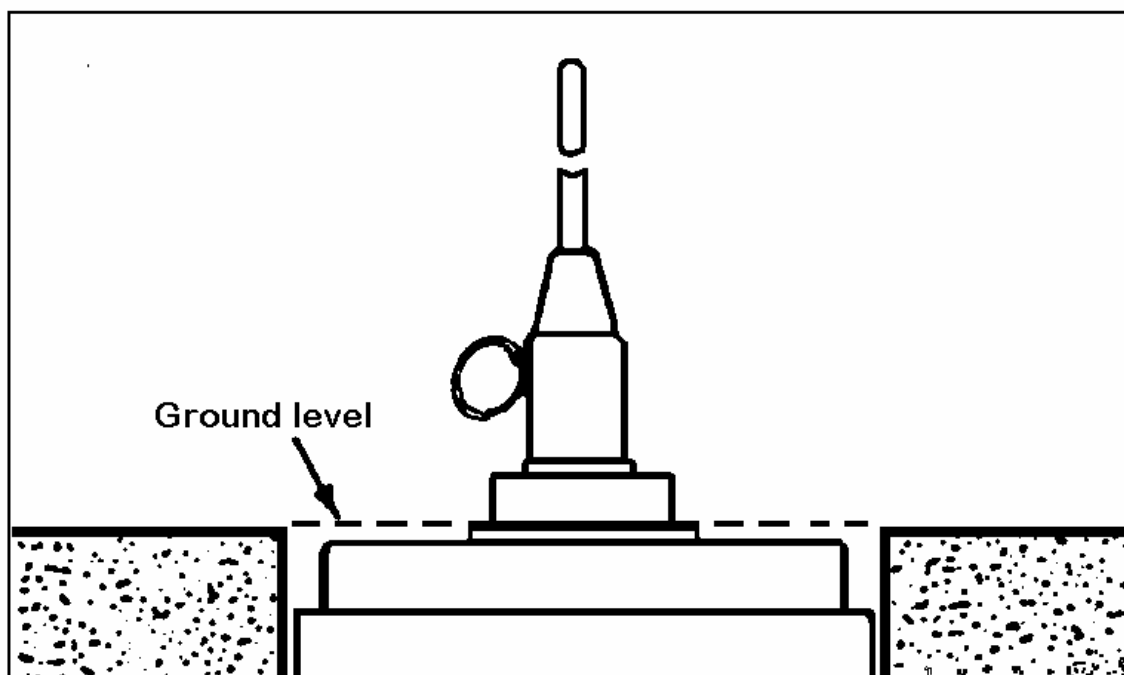


Figure 052-192-1117-4  
M21 AT Mine in a Hole

- b. Check the bottom of the hole to ensure that the ground is solid enough to support the mine. If necessary, place a flat object under the mine to provide a firm foundation. Allow additional depth for the object.

- 5. Emplace the mine.

- a. Put the mine in the hole.
- b. Cover the mine with soil until it is level with the top of the mine.
- c. Press the soil firmly around the sides of the mine.

NOTE: Ensure that no soil falls around or under the plastic collar.

- 6. Assemble the extension rod.

- a. Assemble the three pieces of the extension rod.
- b. Screw the extension rod on the M607 fuse.

WARNING: DO NOT TILT THE EXTENSION ROD. A 20-DEGREE TILT OF THE EXTENSION ROD WILL DETONATE THE MINE.

- 7. Arm the mine.

- a. Squeeze the end of the cotter pin together on the pull ring (Figure 052-192-1117-5).

**Performance Steps**

- b. Remove the cotter pin by holding the fuse firmly in one hand and pulling on the pull ring with the other hand.

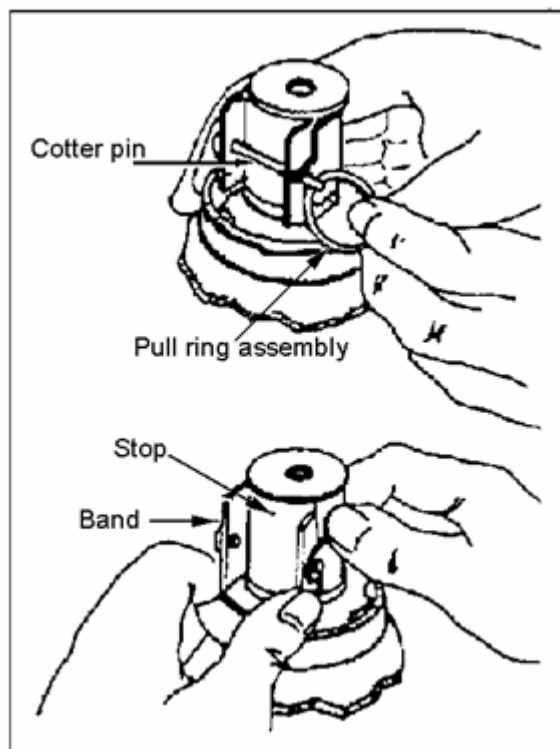


Figure 052-192-1117-5  
Removal of a Cotter Pin and Safety Stop

- c. Remove the safety stop and safety band from the fuse slowly and carefully.
8. Camouflage the mine.
    - a. Add twigs, grass, or other materials to make the area look natural. Ensure that no pressure is applied to the tilt rod or the fuse.
    - b. Place the excess soil in sandbags and remove it from the area.
    - c. Give the band and stop, the pull ring assembly, the shipping plugs, and the closure assembly to the NCOIC.

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions statement. Use inert equipment when performing this task.

Brief soldier: Observe the soldier's performance for any improper procedures that may cause the mine to detonate.

**Performance Measures**

1. Inspected the mine and components.
2. Inserted the booster.
3. Fuzzed the mine.
4. Dug a hole to fit the mine.

**GO**      **NO GO**

_____	_____
_____	_____
_____	_____
_____	_____

**Performance Measures**

5. Emplaced the mine.
6. Assembled the extension rod.
7. Armed the mine.
8. Camouflaged the mine.

**GO**    **NO GO**

_____	_____
_____	_____
_____	_____
_____	_____

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

**References****Required****Related**

FM 5-34  
 GTA 05-10-036  
 GTA 05-10-037  
 TM 43-0001-36

**Remove an M21 Antitank (AT) Mine**  
**052-192-1118**

**Conditions:** As a combat engineer squad member in a field environment, given the location of an emplaced M21 AT mine, an M26 arming wrench, a band and stop, cotter pins, a shipping plug, and a closure assembly.

**Standards:** Remove an M21 AT mine, in the proper sequence, without causing the mine to detonate.

**Performance Steps**

**WARNING:** BEFORE ATTEMPTING TO DISARM AND REMOVE THE MINE, CHECK FOR BOOBY TRAPS, DAMAGE, OR MALFUNCTIONS TO THE MINE. IF ANY OF THESE CONDITIONS EXIST, NOTIFY THE NONCOMMISSIONED OFFICER IN CHARGE (NCOIC). DO NOT ATTEMPT TO DISARM THE MINE.

1. Disarm the mine.

**WARNING:** DO NOT APPLY PRESSURE TO THE TILT ROD OR FUZE AT ANY TIME.

- a. Clear the camouflage away from the mine.
- b. Attach the safety band and safety stop (Figure 052-192-1118-1).

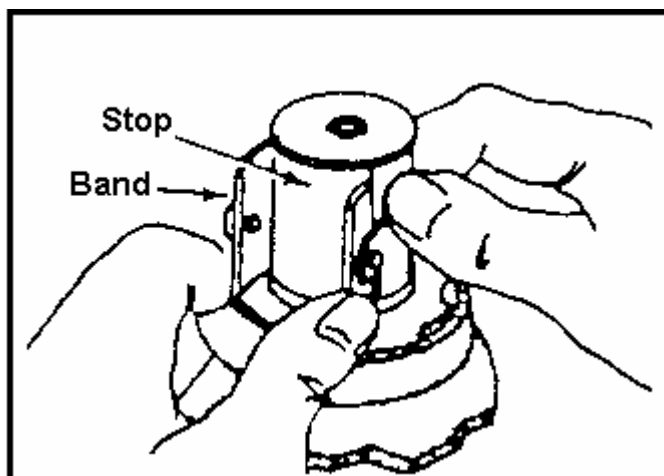


Figure 052-192-1118-1  
Attaching the Band and Stop

- c. Insert the cotter pin into the safety band and safety stop. Spread the ends of the cotter pin (Figure 052-192-1118-2).



## Performance Steps

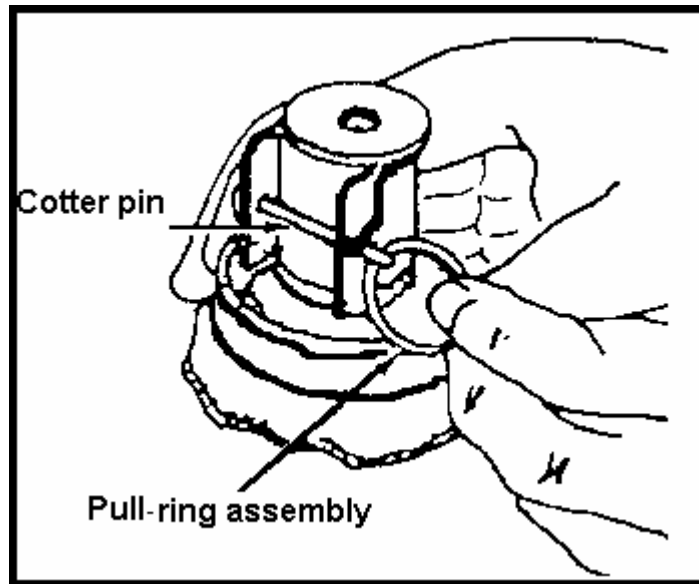


Figure 052-192-1118-2  
Inserting the Cotter Pin

- d. Unscrew and remove the extension rod.
  2. Check for antihandling devices (AHDs).
    - a. Hold the mine firmly in place with one hand. Do not put pressure on the fuse.
    - b. Feel for the AHDs, with the other hand, by digging around the sides and underneath the mine.
- WARNING: IF YOU FIND AN AHD, STOP AND NOTIFY THE NCOIC. DO NOT REMOVE THE MINE.**
3. Remove the mine.
    - a. Remove the mine from the hole.
    - b. Remove the fuse from the mine.
    - c. Install the closure assembly on the fuse.
    - d. Install the shipping plug into the fuse well of the mine.
    - e. Remove the closing plug from the bottom of the mine.
    - f. Remove the booster from the mine.
    - g. Install the closing plug into the booster well.

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions statement. Use inert equipment when performing this task.

Brief soldier: Observe the soldier's performance for any improper procedures that may cause the mine to detonate.

### Performance Measures

	<u>GO</u>	<u>NO GO</u>
1. Disarmed the mine.	—	—
2. Checked for AHDs	—	—
3. Removed the mine.	—	—

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

**References  
Required**

**Related**  
FM 20-32  
FM 5-34  
GTA 05-10-036  
GTA 05-10-037  
TM 43-0001-36

## Prepare an AN/PSS-12 Mine Detector for Operation

### 052-192-1127

**Conditions:** Given an AN/PSS-12 mine detector in its carrying case, new batteries, a Kevlar helmet, and load-bearing equipment (LBE).

**Standards:** Prepare the mine detector for operation, in the proper sequence, without damaging the equipment.

### Performance Steps

1. Remove the carrying bag from the transport case.
  - a. Open the pressure-relief valve on the lid of the carrying case.
  - b. Release the latches and open the metal transport case.
  - c. Remove the carrying bag from the transport case.
2. Inventory and inspect the components of the carrying case.
  - a. Remove the search-head assembly with a telescopic pole, cable, and plug.
    - (1) Inspect the search head for cracks or damage.
    - (2) Inspect the cable connectors for damaged or bent pins.
    - (3) Ensure that the cables are not cut, broken, or frayed.
    - (4) Ensure that the telescopic pole is not bent, dented, or damaged and can be extended and retracted.
  - b. Remove the electronic unit (Figure 052-192-1127-1).

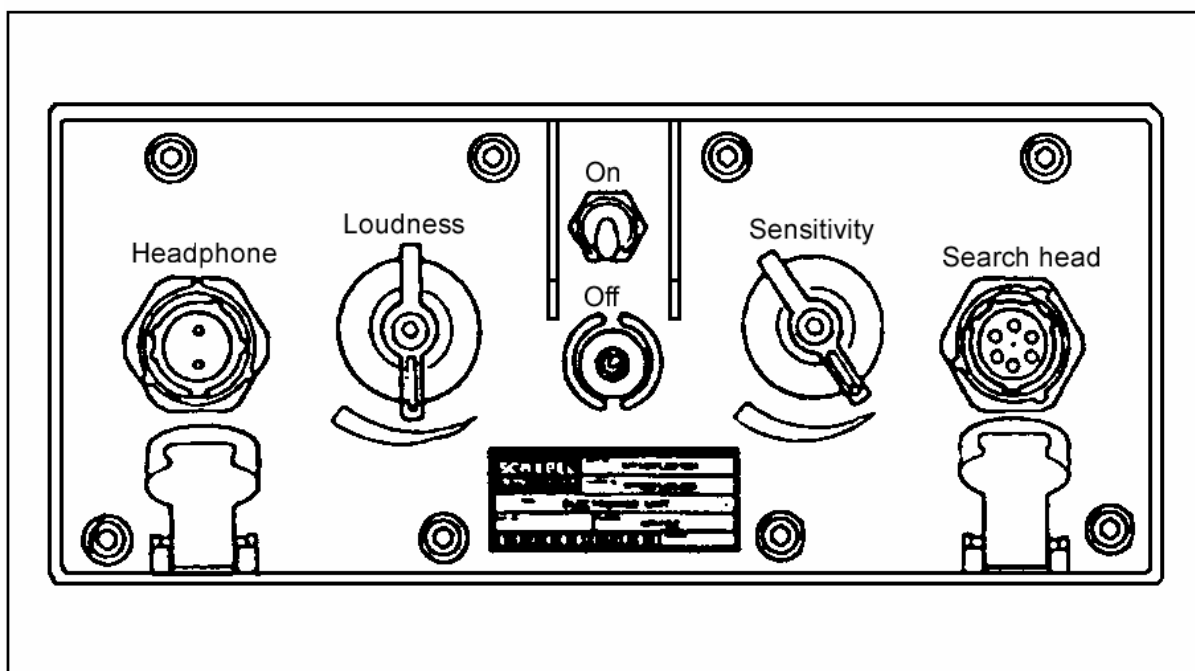


Figure 052-197-1127-1  
Electronics-Control Box

- (1) Ensure that the power switch is set to the OFF position.
- (2) Inspect the unit for cracks, damage, and completeness.
- (3) Ensure that the switch and knobs are present and functional.
- c. Remove the headset with a cable and a plug.

**Performance Steps**

- (1) Inspect the hook-and-pile material on the headphones for serviceability.
    - (2) Inspect the cable connectors for damaged or bent pins.
    - (3) Ensure that the cables are not cut, broken, or frayed.
  - d. Remove the accessory bag and ensure that the spare parts and test items are present. This includes--
    - (1) A spare plastic shear bolt for the telescopic pole.
    - (2) Spare cable clamps.
    - (3) A 5-centimeter test piece for setting the sensitivity of the detector.
    - (4) A list of the contents.
3. Assemble the detector.
  - a. Insert the batteries into the electronic unit.
    - (1) Ensure that the power switch is in the OFF position.
    - (2) Release latches on the battery compartment and remove the cover.
    - (3) Insert the batteries according to the markings displayed on the casing (Figure 052-192-1127-2).

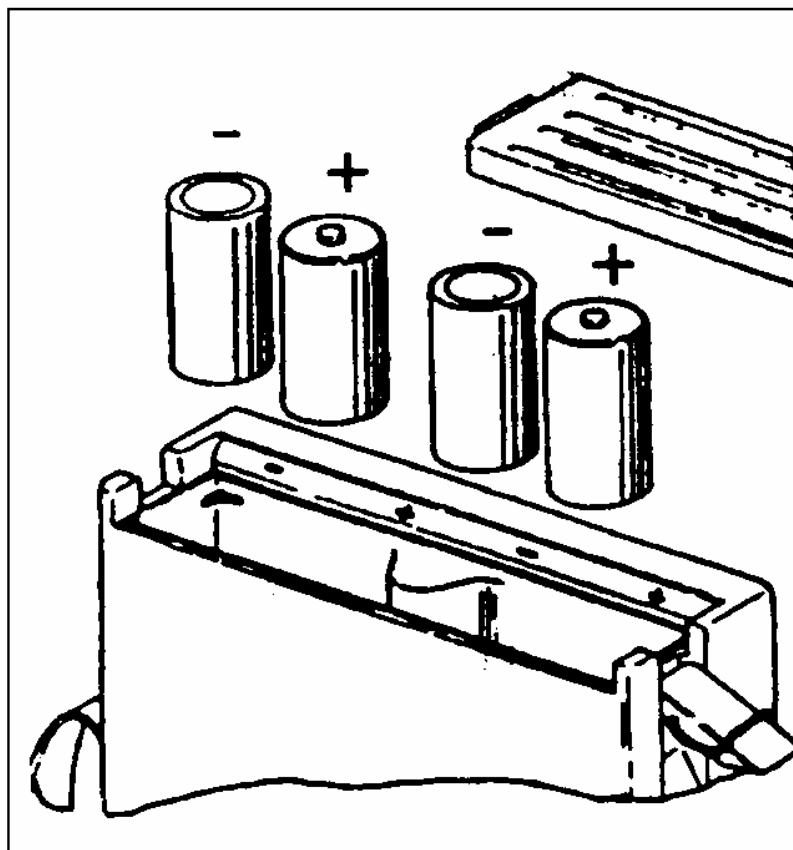
**Performance Steps**

Figure 052-192-1127-2  
Installing Batteries

WARNING: ENSURE THAT THE BATTERY COVER IS COMPLETELY CLOSED AND THAT THE LATCHES ARE IN THE PROPER POSITION. THIS PREVENTS THE INADVERTENT OPENING OF THE BATTERY COMPARTMENT DURING THE DETECTION OPERATION. FAILURE TO COMPLY CAN RESULT IN PERSONAL INJURY, DAMAGE TO EQUIPMENT, AND/OR IMPROPER OPERATION.

- (4) Install and latch the battery cover.
- b. Extend the telescopic pole out to a suitable position from the target position.
  - (1) Press the catch in (located just below the arm support) to unlock the pole (Figure 052-192-1127-3).

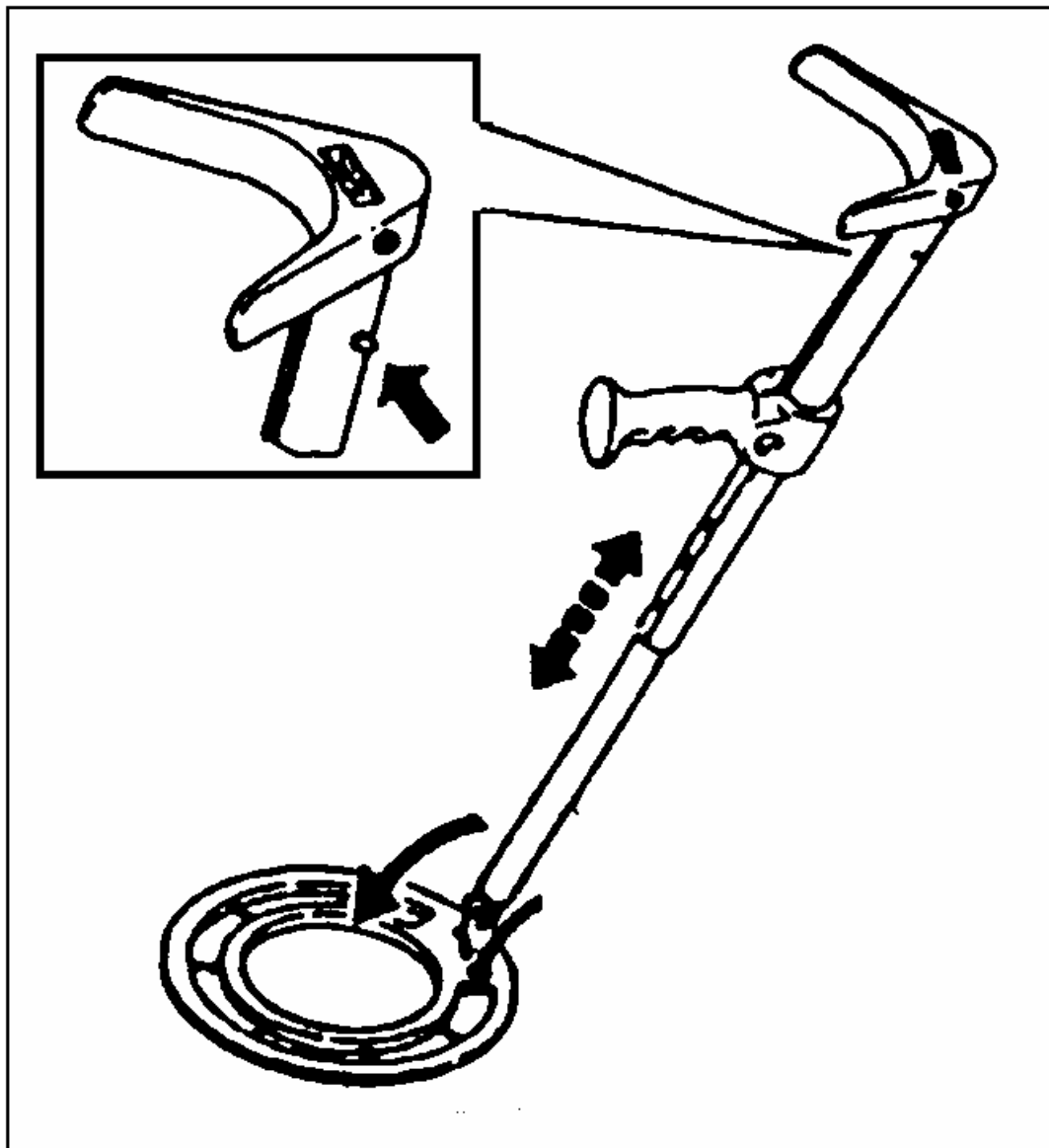
**Performance Steps**

Figure 052-192-1127-3  
Unlocking the Telescopic Pole

- (2) Turn the outer tube until the catch snaps into the guide groove.
- (3) Ensure that the telescopic pole is locked in one of the three-fixed positions.
- c. Connect the search-head cable to the electronics unit. Fit the protective caps of the cable connectors to the corresponding rubber caps on the electronic unit.
- d. Adjust the position of the handle by loosening the knurl nut.
- e. Adjust the position of the search head so it is parallel to the ground.
- f. Fasten the cable to the telescopic pole with the cable clamps.

**Performance Steps****NOTES:**

1. Use only cable clamps that hold tightly onto the smaller plastic portion of the telescopic pole.
2. Clamp the cable from the search head only onto the lower (plastic) portion of the telescopic pole. Do not attach the cable to the upper aluminum shaft. Doing so may cause a variation in the detector's performance.

- (1) Attach the first cable clamp 5 centimeters up from the lower-base pole wing nut.
- (2) Attach the second cable clamp 5 centimeters down from the top portion of the pole.
- (3) Attach the third cable clamp in the middle, between the first and second cable clamps.

NOTE: Do not attach the cable to this clamp. This clamp will become the sensitivity marker clamp. Use of color coding (identification) for the sensitivity marker clamp is recommended.

- g. Attach the electronics unit to the belt. Ensure that--

- (1) Right-handed soldiers put the unit on the left hip.
- (2) Left-handed soldiers put the unit on the right hip.
- (3) The safety strap is placed over the shoulder.

- h. Put the headphone on.

- (1) Place the straps of the headphone over the forehead and on top of the head.
- (2) Place the hook-and-pile material behind the head at the nape of the neck.

4. Conduct initial sensitivity settings and adjustments (Figure 052-192-1127-4).

NOTE: Setting sensitivity with where the soil is similar to where the detector will be used is very important. Otherwise, the sensitivity setting is simply a guess because of the different soil types. Moisture content can influence the sensitivity of the detector.

- a. Remove rings, watches, and jewelry before adjusting or using the mine detector.

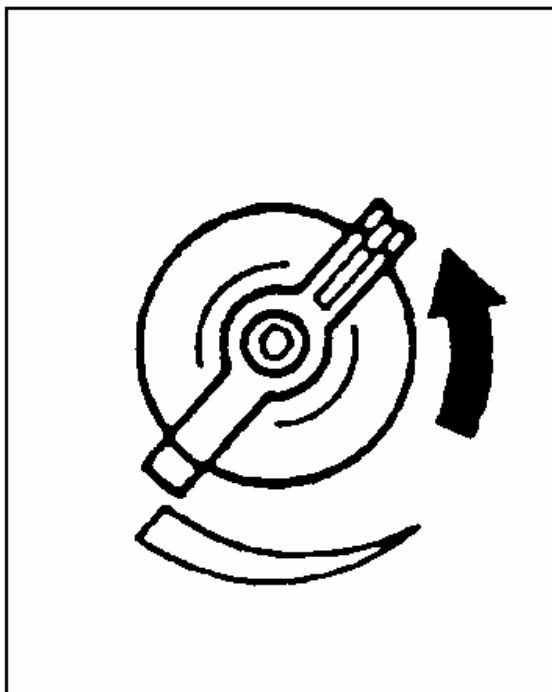


Figure 052-192-1127-4  
Turn the Loudness Knob Counterclockwise

**WARNING: TURN THE LOUDNESS KNOB ALL THE WAY DOWN (COUNTERCLOCKWISE) BEFORE TURNING ON THE MINE DETECTOR. FAILURE TO COMPLY MAY CAUSE HEARING LOSS TO OCCUR.**

**Performance Steps**

- b. Turn the SENSITIVITY and LOUDNESS knobs completely counterclockwise.
- c. Observe the indicator lamp and flip the switch to the ON position. The lamp should give a short flash and then go out. When the lamp --
  - (1) Does not flash, ensure that the batteries are inserted correctly. If the batteries are correctly inserted, replace them.
  - (2) Flashes continuously, the cause may be low-battery voltage. Replace with new batteries.

NOTE: Collect all damaged or low batteries and transport them to the hazardous-waste accumulation site (HWAS).

- d. Hold the search head about 0.66 meters above the ground. Turn the sensitivity knob clockwise until a continuous tone is heard. When this is done, adjust the loudness control.
- e. Set the sound level with the LOUDNESS knob until a ticking tone can be clearly recognized (heard) every 1 to 2 seconds.

NOTE: The check tone resembles a clicking sound and its purpose is to continuously inform the operator that the system is functioning satisfactorily. When the check tone disappears or the frequency decreases, discontinue searching and adjust the unit's sensitivity.

- f. Set and maintain the sensitivity level.
  - (1) The preferred method is to have on hand the most difficult to detect type mine that is expected to be encountered.
    - (a) Bury the mine at the deepest depth that it is expected to be found.
    - (b) Place the detector head lightly on the ground, directly above the mine, and adjust the sensitivity so that the mine can be detected by an easily heard signal from the head set.
    - (c) Begin 0.66 meters from the side of the mine, lightly float the detector head over the ground at a 0.3 meters per second movement. Ensure that the signal can still be easily heard. If not, increase the SENSITIVITY until the signal can be easily heard.
    - (d) Check to see if the signal can still be easily heard. If not, increase the SENSITIVITY until the signal can be easily heard while the detector head is floated over the top of the mine, with the head in light contact with the ground at a rate of 0.3 meters per second.
  - (2) When the threat mine described in step 4f(1) is not available--
    - (a) Bury the test piece vertically at the deepest depth that the threat mine is expected to be encountered. (The depth of the metal component in the test piece is the critical issue.)

NOTE: In the absence of more specific information, bury the test piece so that the metal is at a depth of 5 centimeters. This places the top of the test piece flush with the surface of the ground.

- (b) Place the detector head lightly on the ground directly above the test piece. Adjust the sensitivity so that the test piece can be detected by an easily heard signal from the head set.
- (c) Begin 0.66 meters from the side of the test piece, lightly float the detector head over the ground at 0.3 meters per second movement ensuring that the signal can still be easily heard. If not, increase the SENSITIVITY until the signal can be easily heard.
- (d) Check to see if the signal can still be easily heard. If not, increase the SENSITIVITY until the signal can be easily heard while the detector head is floated over the top of the mine, with the head in light contact with the ground at a rate of 0.3 meters per second.

NOTE: The higher the SENSITIVITY is set (between just being able to detect the sensitivity target and the level where the signal from the soil first becomes audible), the less chance of missing a mine; however, the higher the false alarm rate.

CAUTION: A DEFICIENCY WITH THE AN/PSS-12 IS THAT ITS SENSITIVITY DRIFTS OVER TIME. DURING OPERATION, CHECK THE DETECTOR'S SENSITIVITY EVERY 1 TO 2 METERS OF ADVANCE.



**Performance Steps**

- (3) Move the detector head to a nearby place on the ground over a cleared area (with the SENSITIVITY properly set using a buried mine, a test piece, or a mine simulant).
  - (a) Slide a metal object down the shaft of the detector until the operator hears the same auditory signal that was emitted when the detector head was placed over the buried mine or test piece.

NOTE: It is important that the operator maintain the same body posture and the angle between the shaft (telescoping pole) and the detector head each time the sensitivity check is made.

- (b) Position the middle plastic cable clip at this point on the shaft (the middle clip previously attached without the cable).

NOTE: This clip is the sensitivity marker clip.

- (c) Move the same metal object down the shaft to the sensitivity marker clamp and listen for the same auditory signal is emitted. Do this every 1 to 2 meters for forward advance in the mine lane (or more often then desired). Adjust the sensitivity knob up or down to replicate and maintain the same auditory signal when the same auditory signal is not emitted.

NOTE: A useful metal object for maintaining the sensitivity is a common mason's trowel. The trowel can serve for other needs when mine detection work is ongoing, but clearly many other metal objects such as a bayonet or large metal tool could be used for sensitivity maintenance purposes.

**WARNINGS:**

1. LOW BATTERIES MAY REDUCE DETECTOR PERFORMANCE WELL BEFORE THE INDICATOR LIGHT COMES ON. IF YOU ARE FREQUENTLY ADJUSTING THE SENSITIVITY KNOB TO MAINTAIN A CONSTANT SENSITIVITY SETTING OR IF THE INDICATOR LIGHT COMES ON, DISCARD ALL BATTERIES AND REPLACE THEM WITH NEW ONES.
2. DISCONTINUE SEARCHING AND ADJUST THE UNIT'S SENSITIVITY WHEN THE CHECK TONE DISAPPEARS OR THE FREQUENCY DECREASES.

**Evaluation Preparation:** Setup: Provide the soldier with an operational AN/PSS-12 mine detector in its carrying case. It may be necessary to clear a small area on the ground from metallic clutter that will otherwise confuse the operator and interfere with adjusting the detector for setting the sensitivity. A small piece of ground cleared of clutter (about 1 meter by 0.5 meters) is necessary to use in setting the sensitivity of the detector. Much of the ground, particularly on military installations and battlefield areas, is heavily cluttered. As a result, you may have to search initially to find a place you can easily clear for the evaluation site.

Brief soldier: Tell the soldier to prepare an AN/PSS-12 mine detector for operation.

**Performance Measures**

1. Removed the carrying bag from the transport case.
2. Inventoried and inspected the components of the carrying case.
3. Assembled the detector.
4. Conducted initial sensitivity setting and adjustments.

**GO**      **NO GO**

_____	_____
_____	_____
_____	_____
_____	_____

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

**References****Required****Related**

FM 20-32

TM 5-6665-298-10

## Locate Mines With the AN/PSS-12 Mine Detector

### 052-192-1128

**Conditions:** Given an operational and tuned AN/PSS-12 mine detector, an area with hidden metallic mines, a Kevlar helmet, and load-bearing equipment (LBE).

**Standards:** Locate mines using the mine detector without causing any of the mines to detonate, causing damage to the equipment, or overlooking any mine in the search path.

### Performance Steps

1. Search for mines while in a standing position.
  - a. Sweep the detector head at a rate of 1 foot per second. Float the detector head lightly on the surface of the ground.

**NOTE:** The closer the detector head is to the ground, the deeper the electrical field is projected, and the greater chance there is to detect low-metal mines. Actual contact with the ground improves the electrical coupling; thereby, strengthening the electrical field.

- (1) Adjust the handle to a comfortable position by loosening the knurl nut.
- (2) Adjust the position of the search head so that it can be lightly floated over the ground.
- (3) Move the search head in light contact with the ground. Use a sweeping speed of about 0.3 meters.
- (4) Loosen the wing nut on the plastic bolt that attaches the detector head to the shaft. This can help maintain constant contact with the ground. This allows the head to pivot and the head can be lightly slid across the surface.

### NOTES:

1. Each sweep across the lane must overlap the previous sweep by about one half the width of the detector head. Otherwise, a gap may be left between sweep paths or at the edge of the lane and a low-metal mine can be missed. The AN/PSS-12 detector performance is reduced when the cable between the electronics unit and the top cable clamp is permitted to hang unrestrained during sweeps.
2. In low vegetation, keep the wing nut tight so the position between the head and shaft is fixed. Lightly pat the detector head on the ground, each pat advancing no more than one half the width of the detector head.
3. The inner ring of the search head indicates metal objects by sounding a tone in the headphone. The tone depends on the size (metal content), shape, and position of the object, and its depth underground. To prevent interference during searching operations, the distance between different search heads should not be less than 2 meters. Many conditions of vegetation may not allow the detector head to the ground. Do not push through the vegetation to get the detector head on the ground.

- b. Conduct a sensitivity check and make adjustments about every 1 to 2 meters of the forward advance in the mine lane.

**WARNING:** NEVER SWEEP WITH THE DETECTOR HEAD WHERE ITS PATH CANNOT BE VISUALLY CLEARED FIRST. IF TRIP WIRES ARE A THREAT, USE OTHER TECHNIQUES TO DETECT OR CLEAR THE TRIP WIRES BEFORE CONDUCTING SWEEPING OPERATIONS WITH THE AN/PSS-12 MINE DETECTOR.

2. Search for mines while in a prone position
  - a. Use only the inner part of the telescopic pole of the mine detector.
  - b. Adjust the position of the search head so that it is parallel to the ground.
  - c. Loosen the wing nut on the plastic bolt that attaches the detector head to the shaft to maintain constant contact with the ground. This allows the head to pivot and can be lightly slid across the surface.

**NOTE:** In low vegetation, keep the wing nut tight so the position between the head and shaft is fixed. Lightly pat the detector head on the ground, each pat advancing no more than one half the width of the detector head.

3. Conduct alarm investigation and mine identification procedures.

**Performance Steps****NOTES:**

1. At the first auditory indication of metal in the ground from the detector, the sweep procedure ends and the investigation procedure begins. The purpose of the investigation is to determine if the signal is repeatable and, therefore, a likely mine. If so, the investigation continues with the purpose of gaining more information concerning the size, type (high-metal or low-metal mine), and specific location of the signal source.

2. Small footprints, often as small as 4 to 6 inches in diameter, will indicate low-metal mines. High-metal mines may have footprints 2 to 4 feet in diameter. The footprint is defined as the entire area on the ground where the mine or metallic source causes the detector to generate an auditory signal.

a. Develop a set of points on the ground that identifies the source footprint.

(1) Move the search head away from the signal source until no signal is heard. Slide the search head toward the signal from several clock positions. Use at least five different directions, advancing the detector head from different perimeter points (east, south, west, southeast, southwest).

(2) Note or mark the specific locations of the search head where each auditory signal begins.

NOTE: Once the signal is detected, the detector is no longer slid toward the potential source to avoid coming closer than necessary to a potential mine.

(3) Repeat the process until locations are marked or noted on the ground and the size and shape of the footprint of the auditory signal is understood.

NOTE: Typically, the pattern will resemble a semicircle with the 6 o'clock position nearest to the operator.

**WARNING: THE LARGE FOOTPRINTS OF HIGH-METAL MINES MAY MASK SIGNALS FROM LOW-METAL MINES WITHIN THE FOOTPRINT. ALWAYS ASSUME THAT THERE ARE LOW-METAL MINES WITHIN THIS FOOTPRINT AREA.**

b. Identify the center of large footprints.

NOTE: The airborne technique is a method to identify the center of large footprints quicker than the method previously defined.

(1) Fix the search head so that it can be maintained in a position parallel to the ground surface while it is raised as high as 2 to 3 feet.

(2) Manipulate the search head above the source until the signal can be heard at a single point.

(a) Move the search head in a crossing pattern to produce a smaller and smaller signal area as the pattern is repeated at increasing heights.

NOTE: Near the surface, the signal can be heard over a broad lateral area. When the search head is raised higher off the ground, the area becomes progressively smaller. As the search head is raised higher off the ground, the area where the signal can still be heard is reduced to a point.

(b) Note or mark the center of the mine directly below this point.

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions statement. Use an inert minefield when performing this task. Observe the soldier's performance for any improper procedures that may cause the mines to detonate or cause the soldier to miss a mine in the search path.

Brief soldier: Tell the soldier to locate all buried, metallic objects in a designated path.

**Performance Measures****GO      NO GO**

1. Searched for mines while in a standing position.

\_\_\_\_\_

2. Searched for mines while in a prone position.

\_\_\_\_\_

3. Conducted alarm investigation and mine identification procedures.

\_\_\_\_\_

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

**References  
Required**

**Related**  
FM 20-32  
TM 5-6665-298-10

## Load a Multiple-Delivery Mine System (Volcano)

**052-192-1141**

**Conditions:** As a combat engineer squad member in a field environment, given a Volcano mounted on a 5-ton truck or ammunition carrier and mine canisters.

**Standards:** Load the mine canisters on the Volcano racks, in sequence, without causing injury to personnel or equipment damage. Latch all levers upon completion of the task.

### Performance Steps

1. Unzip the flap on the launcher-rack cover (if installed) to access the levers on the launcher-rack ends.
2. Roll up the cover's flaps and secure them with the fastex fasteners attached to the cover (if the cover is installed).

**WARNING:** BEFORE TO LOADING THE CANISTERS, THE NONCOMMISSIONED OFFICER IN CHARGE (NCOIC) MUST PERFORM A BIT TEST. THE CANISTERS CONTAIN EXPLOSIVE COMPONENTS; TREAT THEM AS AMMUNITION. TOGGLE THE DISPENSER-CONTROL-UNIT (DCU) POWER SWITCH TO THE OFF POSITION TO ENSURE THAT THE DCU IS INACTIVE WHEN INSTALLING THE CANISTERS. VERIFY THAT THE FIRE CIRCUIT SWITCH ON THE DCU IS IN THE OFF POSITION, AND THE SAFETY PIN AND STREAMER ASSEMBLY ARE INSTALLED. DO NOT INSTALL ANY CANISTERS THAT HAVE BEEN DROPPED, HAVE LOOSE END CAPS, OR SHOW ANY OTHER SEVERE DAMAGE. MOVE THE DAMAGED CANISTERS ASIDE AND NOTIFY THE NCOIC.

3. Ensure that the green latching and the red arming levers are in the SAFE (unlatched) position. Each lever plunger should click into position. There are 16 levers per rack.

**NOTE:** Check the movement of the levers. It is recommended that the canisters be installed column by column, working from the front to the rear.

4. Install each canister in the launcher-rack keyhole, ensuring that each canister bottoms out.

**CAUTION:** IF THE LEVERS DO NOT LOCK INTO POSITION, THE CANISTER MAY NOT BE PROPERLY SEATED.

5. Load a rack with canisters. Depress the plunger on each green latching lever, and pull back or push forward on the lever to latch it into position. The plunger will click into position when the lever is locked.
6. Repeat the loading procedures until all of the racks are full.
7. Verify that all of the latching levers are in the latched position. If the lever moves, it is not in the latched position.

**NOTE:** The NCOIC will perform a mine-canister test when all of the canisters are installed, and the latching levers are secured.

**Evaluation Preparation:** Setup: Provide the soldier with the items in the conditions statement.

**Brief soldier:** Inform the soldier that this is a squad or combined performance with supervision. The critical part of the evaluation is the soldier's ability to follow instructions and to assist others in the completion of all tasks.

### Performance Measures

1. Uncovered the rack and secured the flaps with fastex fasteners.
2. Ensured that the green latching and the red arming levers were unlatched or in the SAFE position.

**GO**      **NO GO**

\_\_\_\_\_

\_\_\_\_\_

**Performance Measures****GO**    **NO GO**

- |  |       |       |
|--|-------|-------|
| 3. Installed the canisters in the launcher-rack keyhole, ensuring that each canister bottomed out. | _____ | _____ |
| 4. Loaded the rack with the canisters.   | _____ | _____ |
| 5. Repeated the loading procedures until all of the racks were full.                               | _____ | _____ |
| 6. Verified that all of the latching levers were in the locked and latched position.               | _____ | _____ |

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

**References**  
**Required**

**Related**  
 TM 9-1095-208-10-1

### Install an M5 Pressure-Release Firing Device on Antitank (AT) Mines

#### 052-192-1154

**Conditions:** As a combat engineer squad member in a field environment, given an M15 or an M19 AT mine with the appropriate fuse or detonator and arming wrench; an M5 pressure-release firing device; an M1 or an M2 mine activator; a standard base; 10- and 18-gauge wire; an entrenching tool; and a flat, solid object (wood or rock).

**Standards:** Install the M5 pressure-release firing device on the M15 or the M19 AT mine, in the proper sequence, without causing the mine to detonate.

#### Performance Steps

1. Install the M15 or M19 AT mine.
  - a. Inspect the mine and the appropriate fuse or detonator.
  - b. Install the fuse or the detonator in the mine.
  - c. Dig a hole to fit the mine, with a trench coming off of the side at a 45-degree angle toward the friendly side (Figure 052-192-1154-1).

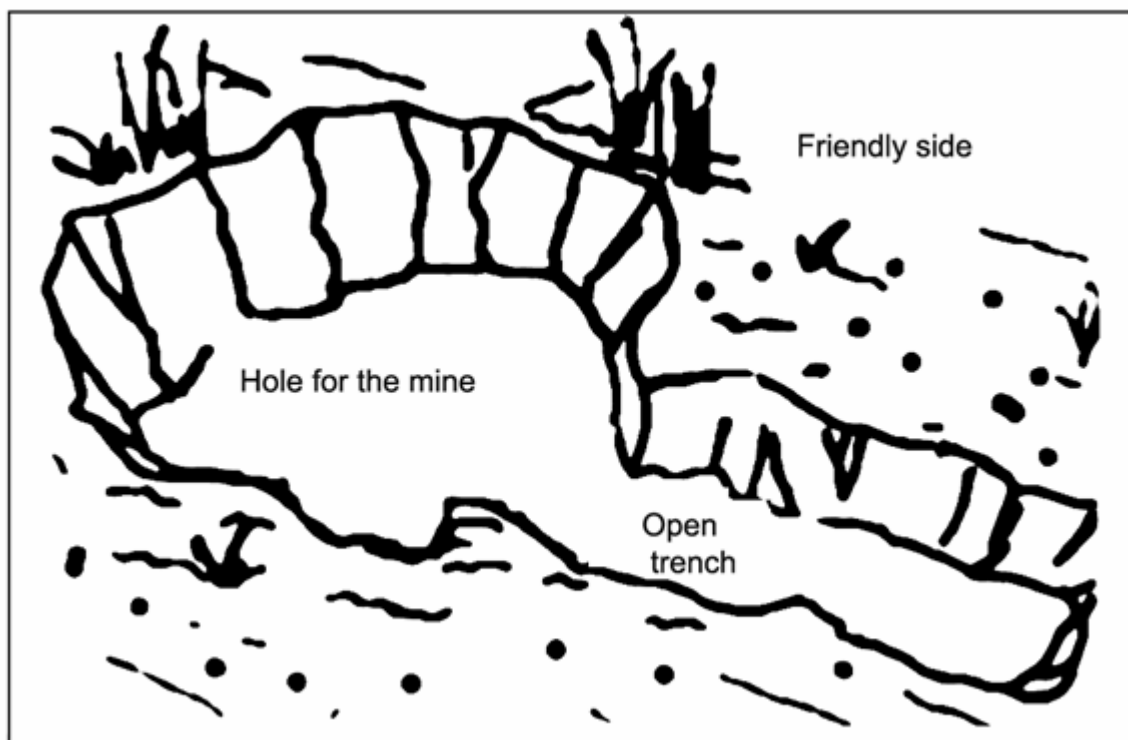


Figure 052-192-1154-1  
Mine Hole With an Open Trench

2. Install the M5 pressure-release firing device.

**WARNING: HANDLE THE ANTIHANDLING DEVICE (AHD) WITH CARE DURING ASSEMBLY. FAILURE TO DO SO COULD RESULT IN A MINE DETONATION.**

  - a. Inspect the firing device for damage.

**Performance Steps**

- b. Keep pressure on the lid while inserting a length of 10-gauge wire in the positive safety hole. Remove the locking safety pin, and replace it with a length of 18-gauge wire (Figure 052-192-1154-2).

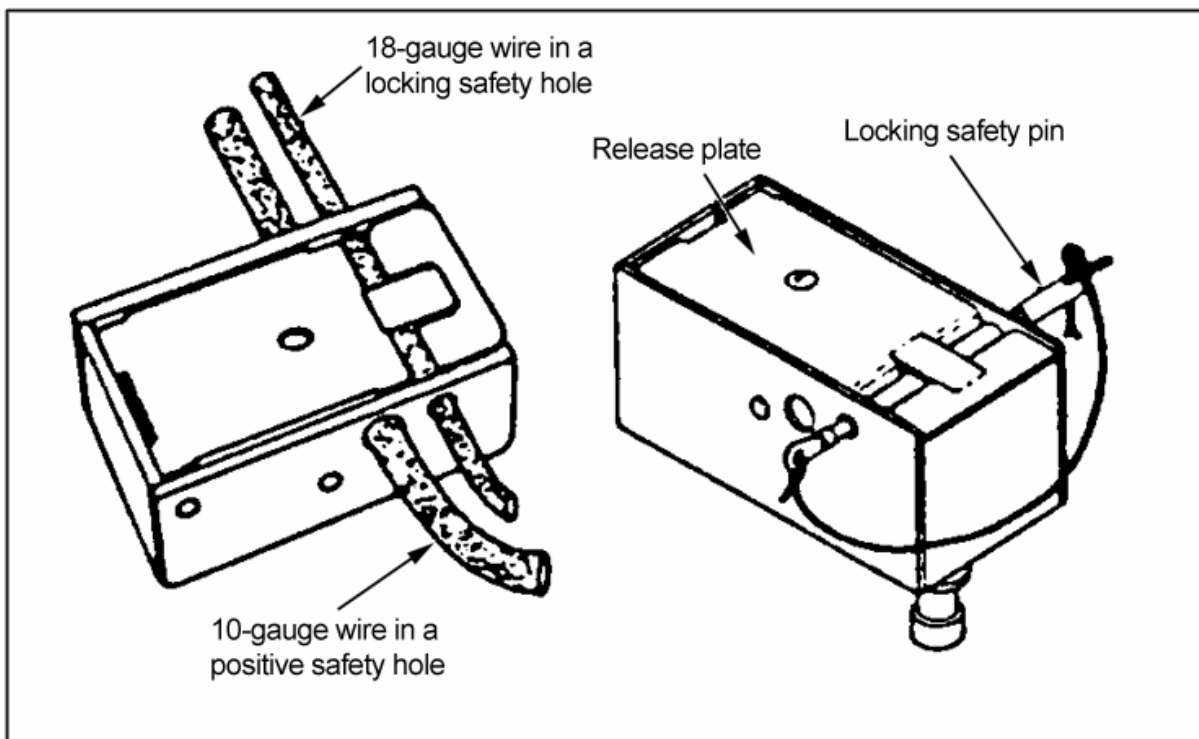


Figure 052-192-1154-2  
Pressure-Release Firing Device

NOTE: Other items, such as a wire clothes hanger, may be used instead of the 10- or 18-gauge wire.

- c. Screw the activator to the standard base. Figure 052-192-1154-3 shows M1 and M2 AT-mine activators.



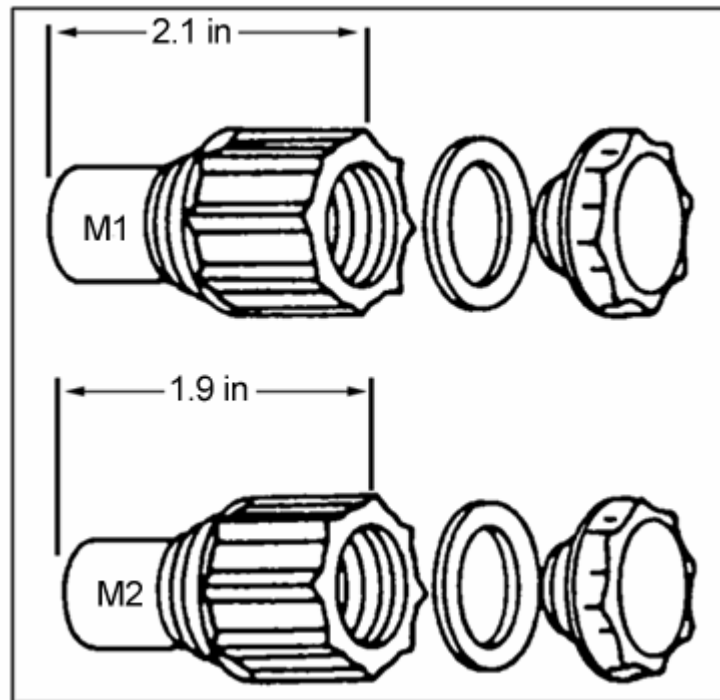
**Performance Steps**

Figure 052-192-1154-3  
M1 and M2 AT-Mine Activators

NOTE: The M1 activator is used with the M15 AT mine, and the M2 activator is used with the M19 AT mine.

- d. Screw the standard base to the M5 firing device (Figure 052-192-1154-4).

## Performance Steps

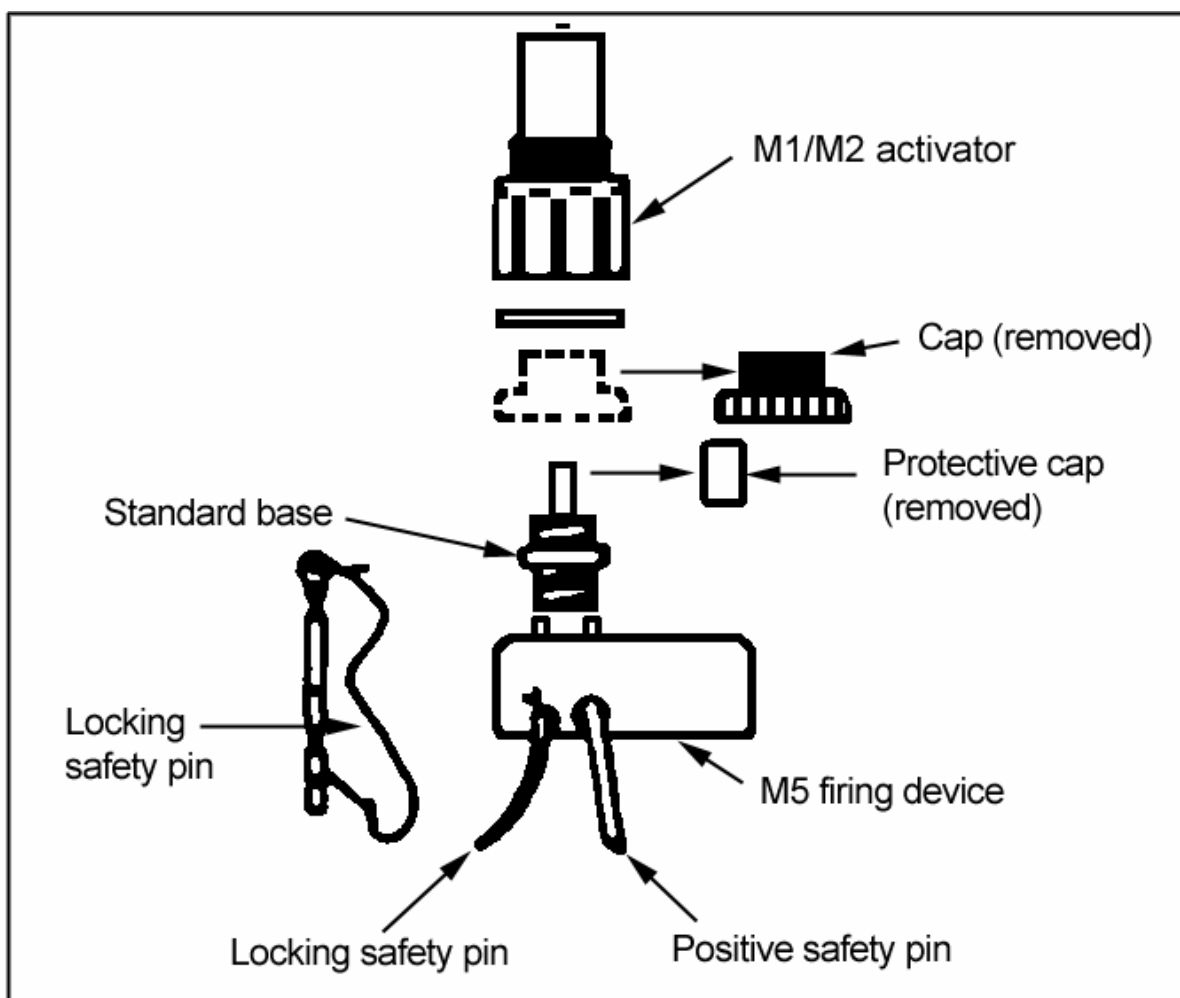


Figure 052-192-1154-4  
M5 Firing Device

NOTE: Ensure that the pins are oriented toward the outside edge of the mine for easy removal and that the safety pins do not fall out.

- e. Place the mine in the hole upside down. Screw the M5 firing device into the secondary fuse well on the bottom of the mine.
- f. Turn the mine over in the hole. Ensure that the safety pins remain in place. Place the firing device on a solid, level surface with the pins pointing toward the trench (Figure 052-192-1154-5).

## Performance Steps

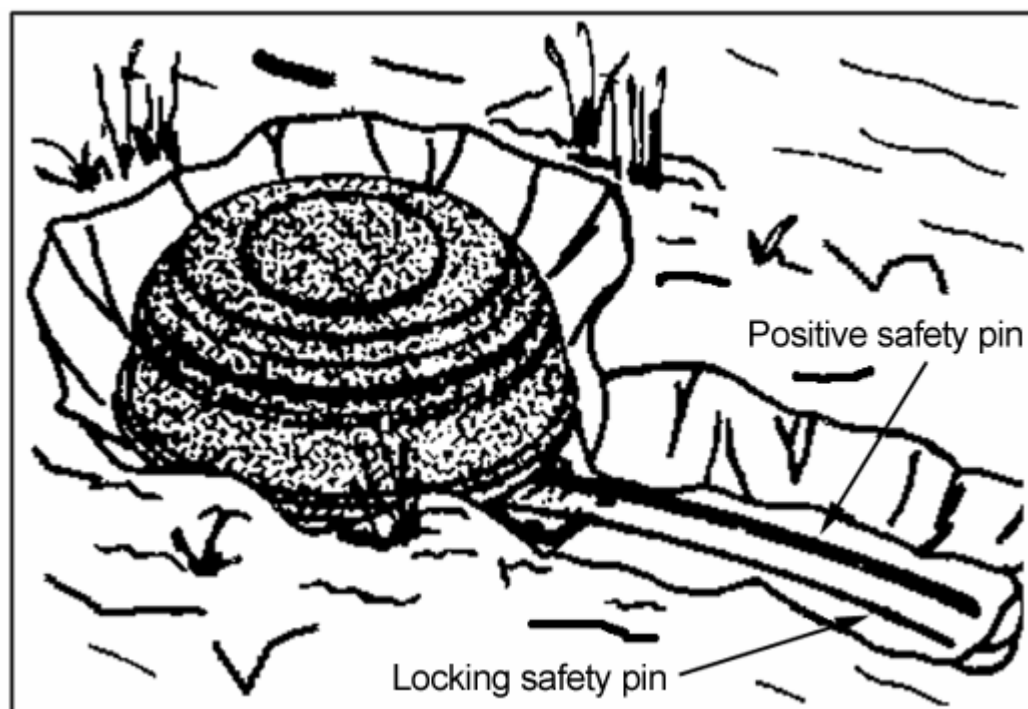


Figure 052-192-1154-5  
Arming the Mine

**WARNING:** ENSURE THAT THE MINE AND THE FIRING DEVICE ARE RESTING ON A FIRM FOUNDATION BEFORE REMOVING THE PINS.

3. Arm the mine.
  - a. Arm the mine.
  - b. Cover and camouflage the mine up to the pressure plate. Leave the trench at the side of the mine exposed. This will leave enough room to remove the safety pins.

4. Arm the firing device.
  - a. Remove the locking safety pin.

**WARNING:** IF YOU FEEL A JAR OR HEAR A METALLIC CLICK, STOP AND NOTIFY THE NONCOMMISSIONED OFFICER IN CHARGE (NCOIC). THE FIRING PIN HAS MOVED FORWARD AND IS RESTING ON THE POSITIVE SAFETY PIN. DO NOT REMOVE THE POSITIVE SAFETY PIN.

- b. Remove the positive safety pin.

**WARNING:** IF THE POSITIVE SAFETY PIN IS DIFFICULT TO REMOVE, STOP AND NOTIFY THE NCOIC.

- c. Finish camouflaging the mine. Give the safety pins to the NCOIC.

**Evaluation Preparation:** Setup: Provide the soldier with the items in the conditions statement. The soldier will install the M15 AT mine or the M19 AT mine. Use inert equipment when performing this task.

**Brief soldier:** Ensure that the soldier has the proper fuse or detonator, an arming wrench, and the appropriate activator for the mine being installed.

## Performance Measures

1. Installed the M15 or M19 AT mine.

**GO**      **NO GO**

—      —

**Performance Measures**

2. Installed the M5 pressure-release firing device.
3. Armed the mine.
4. Armed the firing device.

**GO**    **NO GO**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

**References****Required****Related**

FM 20-32

FM 5-34

GTA 05-10-036

GTA 05-10-037

TM 43-0001-36

TM 9-1375-213-12

## Remove an M5 Pressure-Release Firing Device From Antitank (AT) Mines

### 052-192-1155

**Conditions:** As a combat engineer squad member in a field environment, given the location of an emplaced M15 or M19 AT mine with an M5 firing device attached, 10- and 18-gauge wire, and the appropriate arming wrench.

**Standards:** Remove the M5 firing device from the mine, in the proper sequence, without causing the mine to detonate.

#### Performance Steps

WARNING: DISARMING AN ARMED FIRING DEVICE IS CONSIDERED HAZARDOUS. ALL UNNECESSARY PERSONNEL MUST LEAVE THE AREA DURING DISARMING PROCEDURES. BEFORE ATTEMPTING TO DISARM AND REMOVE THE MINE, CHECK FOR PRESSURE PRONGS, TILT RODS, TRIP WIRES, AND ANY OTHER TYPES OF BOOBY TRAPS. IF ANY OF THESE CONDITIONS EXIST, NOTIFY THE NONCOMMISSIONED OFFICER IN CHARGE (NCOIC). DO NOT ATTEMPT TO DISARM THE MINE.

1. Locate the firing device.

WARNING: DO NOT APPLY PRESSURE TO THE MINE'S PRESSURE PLATE AT ANY TIME.

WARNING: DO NOT RELEASE THE PRESSURE THAT IS BEING APPLIED TO THE DEVICE.

- a. Clear the camouflage away from the mine.
- b. Hold the mine firmly in place with one hand. Do not put pressure on the pressure plate.
- c. Feel with the other hand for antihandling devices (AHDs), by digging around the sides and underneath the mine until the firing device is located.

2. Disarm the firing device.

- a. Install the positive safety pin (10-gauge wire).
- b. Install the locking safety pin (18-gauge wire).

3. Use the appropriate arming wrench to disarm the mine.

4. Remove the mine and firing device from the hole. Ensure that the safety pins remain in place.

5. Remove the firing device from the mine.

- a. Turn the mine upside down and remove the firing device from the mine. Ensure that the safety pins remain in place on the firing device.
- b. Disassemble the activator and the standard base from the firing device.

6. Remove the fuse or detonator from the mine.

7. Give all of the components to the NCOIC.

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions statement. The soldier will remove the M15 AT mine or the M19 AT mine. Use inert equipment when performing this task.

Brief soldier: Ensure that the soldier has the proper arming wrench for the mine being disarmed.

#### Performance Measures

1. Located the firing device.

**GO**      **NO GO**

\_\_\_\_\_

2. Disarmed the firing device.

\_\_\_\_\_

3. Used the appropriate arming wrench to disarm the mine.

\_\_\_\_\_

**Performance Measures**

- |  | <u><b>GO</b></u> | <u><b>NO GO</b></u> |
|--|------------------|---------------------|
| 4. Removed the mine and firing device from the hole. Ensured that the safety pins remained in place. | _____            | _____               |
| 5. Removed the firing device from the mine.  | _____            | _____               |
| 6. Removed the fuse or detonator from the mine.  | _____            | _____               |
| 7. Gave all of the components to the NCOIC.  | _____            | _____               |

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

**References****Required****Related**

FM 20-32  
 FM 5-34  
 GTA 05-10-036  
 GTA 05-10-037  
 TM 43-0001-36  
 TM 9-1375-213-12

## Emplace an M93 Hornet ( Wide-Area Munition [WAM]) for Manual Operations

### 052-192-1225

**Conditions:** As a combat engineer squad member in a field environment, given an M93 Hornet still in the shipping configuration and a suitable area to emplace munitions.

**Standards:** Unpack, setup, and emplace the Hornet, in the proper sequence, away from obstructions. Arm the munition to fire at enemy targets or set the correct time for self-destruction. Avoid injury to personnel or equipment damage.

### Performance Steps

1. Unpack the Hornet.
  - a. Inspect the munition container.
    - (1) Check the container for dents, gouges, or any excessive structural damage that would prohibit the removal of the munition. If the container is damaged to an extent that the munition cannot be safely removed, or the munition is damaged, notify the noncommissioned officer in charge (NCOIC).
    - (2) Notify the NCOIC if the security seal is missing.
    - (3) Check the humidity indicator card. If the humidity indicator card reads 40 percent or more, notify the NCOIC. The humidity indicator card turns pink when the indicator reaches 40 percent.
  - b. Open the munition container.
    - (1) Break, remove, and discard the security seal.

NOTE: The pressure-relief screw does not need to be turned to open the container.

- (2) Pull the ring from the handle and rotate the handle 180 degrees (up). (Turn the pressure-relief screw only if the cover handle is hard to rotate and the container will not open.)
- (3) Rotate the cover shaft counterclockwise until the shaft is clear of the bayonet slots in the rim.
- (4) Lift and remove the cover.
- (5) Remove the top cushion containing the desiccant and the spare (backup) active battery pack.
- (6) Remove the Hornet from the container.
- (7) Remove the sealed active battery packs from the Hornet's handle and the top cushion in the shipping container, and perform a visual inspection.

NOTE: The life of an active battery pack is 10 hours, which includes powering the Hornet through its safe-separation time. If the total prearm, travel, employment, and safe-separation time exceeds 10 hours, the Hornet can not be armed until a new active battery pack is inserted, and the prearming process is repeated.

- (8) Retain the active battery pack for munition emplacement.
- (9) If an active battery is found to be damaged, defective, or in any way not usable, wrap it in its plastic bag (or other nonconductive wrapping), and use the spare active battery pack. Notify the NCOIC.
- (10) Replace all of the cushioning and the desiccant, and replace and secure the cover on the container.
- (11) Save the container for reuse.

**WARNING:** DO NOT REMOVE THE SAFETY AND HANDLING (S&H) ASSEMBLY UNTIL THE MUNITION IS READY TO BE ARMED.

2. Remove the munition cover (Figure 052-192-1225-1).

## Performance Steps

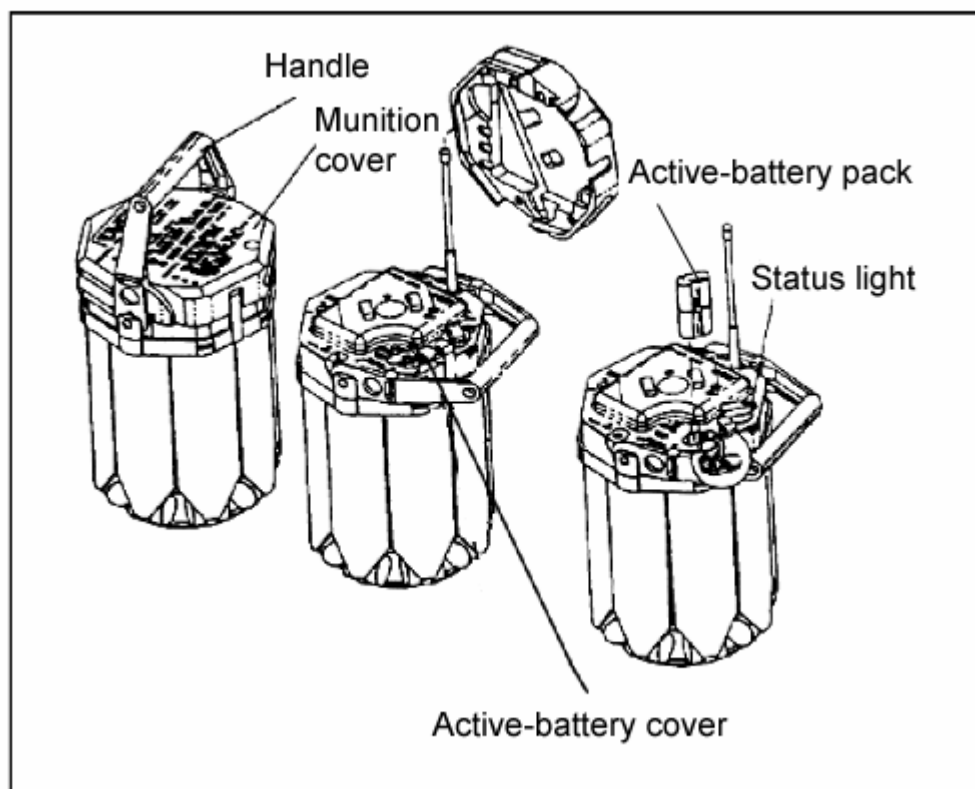


Figure 052-192-1225-1  
Muniton Cover Removal and Battery Installation

- a. Place the Hornet on a surface with a 15 percent or less slope.
- b. Rotate the handle 90 degrees in the direction indicated on the muniton cover. Remove the cover and retain.

**WARNING:** DO NOT INSTALL THE ACTIVE BATTERY PACK IF THE MUNITION CONTROLS ARE BROKEN OR MISSING. DISPOSE OF THE DEFECTIVE MUNITION ACCORDING TO LOCAL PROCEDURES.

3. Install the active battery pack (Figure 052-192-1225-1).
  - a. Remove the active battery cover.
  - b. Install the active battery pack.
  - c. Reinstall the active battery cover.
  - d. Annotate the time that the active battery pack was placed in the munition.
  - e. Check the status light. If the status light does not turn on, replace the active battery pack with the spare-battery pack. If the spare battery-pack fails, notify the NCOIC.

**CAUTION:** IF THE STATUS LIGHT DOES NOT LIGHT WITHIN 3 SECONDS (EVEN AFTER THE BATTERY PACK HAS BEEN REPLACED), NOTIFY THE NCOIC.

4. Set the controls on the Hornet to the manual mode (Figure 052-192-1225-2).



## Performance Steps

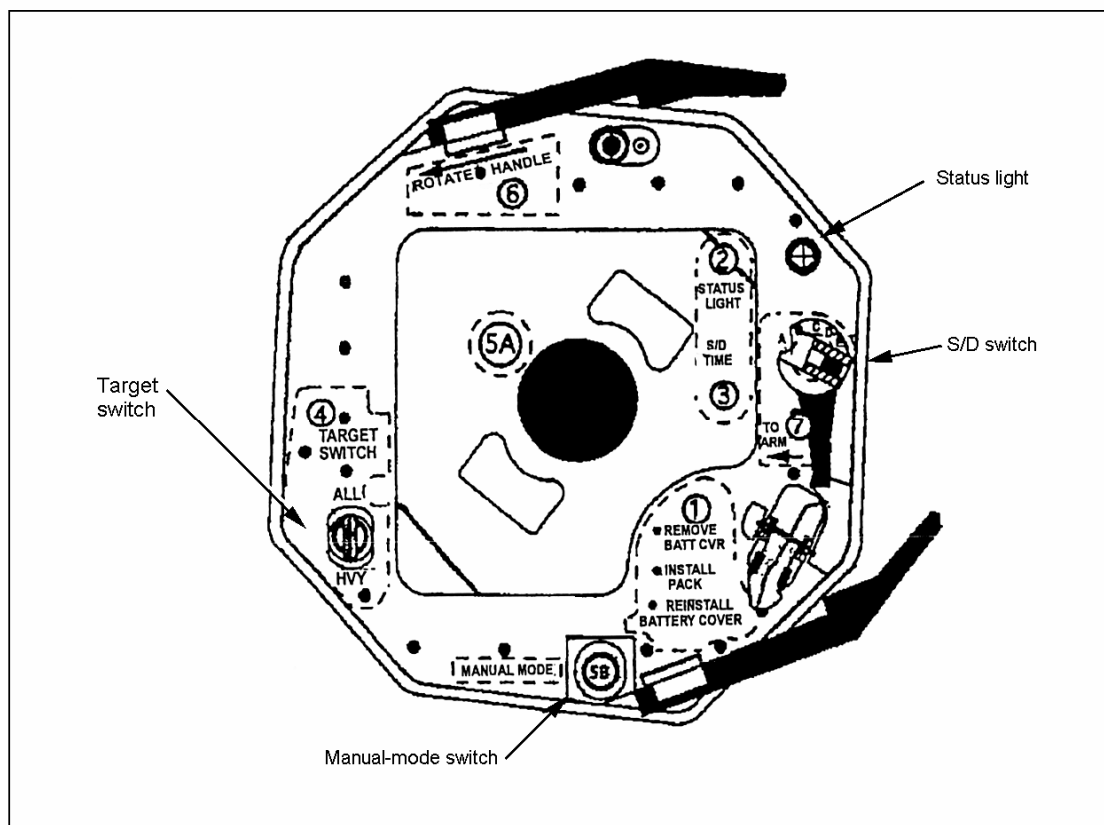


Figure 052-192-1225-2  
The Hornet's Indicators and Controls

NOTE: The control-panel operating sequence is provided on the munition cover. Items on the control panel are identified by a corresponding sequence number inside of a white circle.

**CAUTION: FAILURE TO FOLLOW THE PROPER MUNITION OPERATING SEQUENCE WILL RESULT IN AN UNARMED MUNITION.**

- a. Set the self-destruct (S/D) switch to the mission setting by turning the knob clockwise.

NOTE: The following settings apply to the S/D switch: A = 4 hours, B = 2 days, C = 5 days, D = 15 days, and E = 30 days. The S/D switch is preset to position A.

- b. Adjust the target switch to HVY for heavy track vehicles or ALL for all track vehicles.

**WARNING: BEFORE PLACING THE MUNITION IN A MANUAL MODE, ENSURE THAT THE SWITCH IS IN THE CORRECT MISSION SETTING. AN IMPROPER S/D SWITCH SETTING WILL RESULT IN AN INACCURATE DETONATION TIME. WHEN THE MUNITION IS IN THE MANUAL MODE, ADJUSTING THE S/D KNOB WILL NOT CHANGE THE S/D TIME.**

- c. Remove the pull tab from the manual-mode switch by pulling up on, or pushing up on, the outer edge of the tab.
- d. Depress the manual-mode switch and hold it for 5 seconds. The status light should start flashing.

**CAUTION: IF THE STATUS LIGHT DOES NOT FLASH WITHIN 5 SECONDS OF DEPRESSING THE MANUAL SELECT SWITCH, REPEAT STEP 4D. IF THE STATUS LIGHT STILL DOES NOT WORK, REMOVE THE ACTIVE BATTERY PACK AND NOTIFY THE NCOIC.**

- e. Release the manual-mode switch when the status light flashes.

**Performance Steps**

- f. Reinstall the munition cover if the munition is going to be transported. Align the cover above the munition, and place the antenna into the slot under the cover. Press the cover down on the munition.

NOTE: During installation, the munition cover must be aligned with the status light opening and the tang of the S&H assembly.

- g. Verify that the status light is flashing by looking through the hole on the munition cover.
- h. Rotate the handle 90 degrees to a vertical (carry) position.
- i. Secure the Hornet in the host vehicle. Transport the Hornet to the munition emplacement location.

5. Emplace the Hornet.

- a. Place the Hornet on a surface with a slope no more than 27 percent (15 degrees), beyond the obstruction emplacement distance (Table 052-192-1225-1).

Maximum Obstruction Height (in feet)	Emplacement Distance From Obstacle (in feet)
3.1	6.5
5.0	10.0
6.5	11.5
8.0	14.0
10.0	16.0
11.5	21.0
13.0	23.0
15.0	27.5
16.0	33.0

Table 052-192-1225-1  
Obstruction/Distance Chart

- b. Look through the hole in the munition cover, and verify that the status light is flashing (Figure 052-192-1225-3).

## Performance Steps

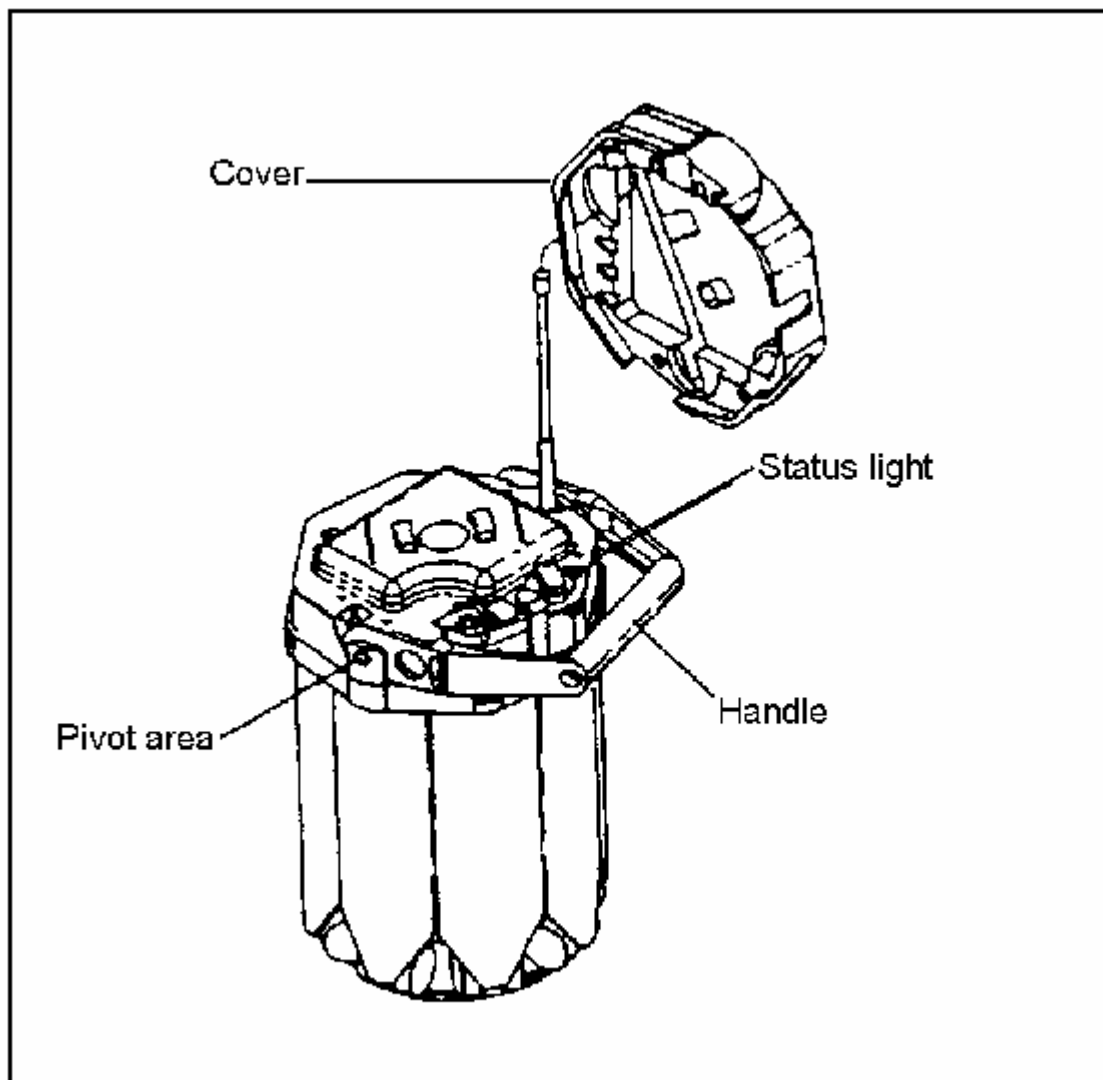


Figure 052-192-1225-3  
Removing the S&H Assembly

c. Rotate the handle 90 degrees to a down position (parallel to the munition body).

d. Remove the munition cover and retain.

**WARNING: DO NOT REMOVE THE S&H ASSEMBLY UNTIL THE MUNITION IS READY TO BE ARMED.**

e. Rotate the handle 180 degrees to a down position (parallel to the munition body).

**WARNING: IF THE S&H ASSEMBLY CANNOT BE REMOVED, DO NOT CUT OR FORCE IT OFF THE MUNITION. NOTIFY THE NCOIC.**

f. Place your hands, near the pivot area, on both sides of the S&H assembly. Lift the assembly straight up and off of the munition.

g. Rotate the S/D switch counterclockwise to the unlocked (U) position.

**WARNING: WHEN THE ARM SWITCH IS PLACED IN THE ARMED POSITION, VERIFY THAT THE RED SLIDER TAB MOVES OUTWARD ABOUT 1/8 INCH. THE MUNITION IS NOW ARMED, AND IT CANNOT BE RETURNED TO THE SAFE POSITION.**

**Performance Steps**

- h. Rotate the arm switch to the armed position. If the arm switch will not rotate to the armed position, replace the S&H assembly, and notify the NCOIC.
- i. Ensure that the status light goes out. If the status light does not go out, move away from the munition, and report a possible munition malfunction to the NCOIC.

**WARNING:** WHEN THE ARM LEVER IS IN THE ARMED POSITION, THE MUNITION COULD BE ARMED.

- j. Evacuate all personnel from the area immediately.

- k. Perform all steps in the proper sequence.

**WARNING:** THE SAFE-SEPARATION TIME FOR THE HORNET IS 5 TO 6 MINUTES. ENSURE THAT ALL PERSONNEL ARE AT LEAST 520 YARDS AWAY FROM THE OBSTACLE BEFORE THE EXPIRATION OF THE SAFE-SEPARATION TIME.

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions.

**Brief soldier:** Tell the soldier that he will be required to complete the performance measures according to the standards set forth in this task.

**Performance Measures**

	<u><b>GO</b></u>	<u><b>NO GO</b></u>
1. Unpacked the Hornet.	_____	_____
2. Removed the munition cover.	_____	_____
3. Installed the active battery pack.	_____	_____
4. Set the controls on the Hornet to the manual mode.	_____	_____
5. Emplaced the Hornet.	_____	_____
6. Performed all steps in the proper sequence.	_____	_____

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

**References****Required****Related**

TM 9-1377-202-10

## Identify Mines and Firing Devices, Friendly and Enemy

### 052-192-1230

**Conditions:** You are in a field environment, given various emplaced friendly and enemy mines and/or firing devices or shown various friendly and enemy mines and/or firing devices (mock-up training aids or flash cards).

**Standards:** Recognize all the mines and firing devices and distinguish whether each item is either friendly or enemy equipment.

#### Performance Steps

NOTE: Refer to Field Manual (FM) 20-32 and countermine identification cards, and become familiar with friendly and enemy mines and firing devices before the evaluation of this task.

**Evaluation Preparation:** Setup: In a classroom setting, provide the soldier with the items in the conditions. In a field environment, provide the soldier with emplaced mockups, training devices, or actual items.

Brief soldier: Inform the soldier that photographs or similar training aids of mines and/or firing devices will be shown for 30 seconds each. During each 30-second period, the soldier must recognize and distinguish each item as either friendly or enemy equipment.

#### Performance Measures

1. Recognized all mines and firing devices.
2. Distinguished all mines as either friendly or threat.

**GO**      **NO GO**

\_\_\_\_\_

\_\_\_\_\_

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

#### References

**Required**  
FM 20-32

**Related**  
FM 5-34

## Perform Preventive-Maintenance Checks and Services (PMCS) on the Mine Clearing Line Charge (MICLIC)

**052-192-1231**

**Conditions:** As a combat engineer squad member in a field environment, given a MICLIC, Department of the Army (DA) Forms 2404 and 5988-E, and Technical Manual (TM) 9-1375-215-14&P.

**Standards:** Refer to TM 9-1375-215-14&P to perform a PMCS on a MICLIC. Identify all crew-level deficiencies or shortcomings and correct them at crew level. Report all other deficiencies and shortcomings to organizational maintenance on a DA Form 2404 or 5988-E. Comply with all safety precautions, and avoid injury to personnel and equipment damage.

### Performance Steps

NOTE: Reference TM 9-1375-215-14&P to perform PMCS on a MICLIC.

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions statement. Deficiencies may be placed on the equipment to further manipulate the task.

Brief soldier: Tell the soldier that he will be required to complete the performance measures according to the standards set forth in this task.

Performance Measures	<u>GO</u>	<u>NO GO</u>
1. Referenced TM 9-1375-215-14&P to perform PMCS on a MICLIC.	—	—
2. Used the proper inspection interval, depending on the time of equipment usage, to perform a before-, during-, or after-operation PMCS.	—	—
3. Corrected all crew-level deficiencies and shortcomings.	—	—
4. Reported all other deficiencies and shortcomings to organizational maintenance on a DA Form 2404 or 5988-E.	—	—
5. Complied with all safety precautions and avoided injury to personnel and equipment damage.	—	—

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

### References

#### Required

DA FORM 2404  
DA FORM 5988-E  
TM 9-1375-215-13&P

#### Related

**Prepare a Modular-Pack Mine System (MOPMS) for Operation in the Hardwired Mode**  
**052-192-1232**

**Conditions:** As a combat engineer squad member in a field environment, given a MOPMS, an M34 blasting machine, an M51 test set, 300 meters of field wire, wire cutters, and a preplanned mine site.

**Standards:** Prepare the MOPMS in the hardwired mode, in the proper sequence, without causing premature detonation, equipment damage, or injury to personnel.

**Performance Steps**

1. Transport the dispenser to the designated location. Place the dispenser on a solid, flat surface, with the arrow on the top of the dispenser pointing toward the center of the planned minefield location (Figure 052-192-1232-1).

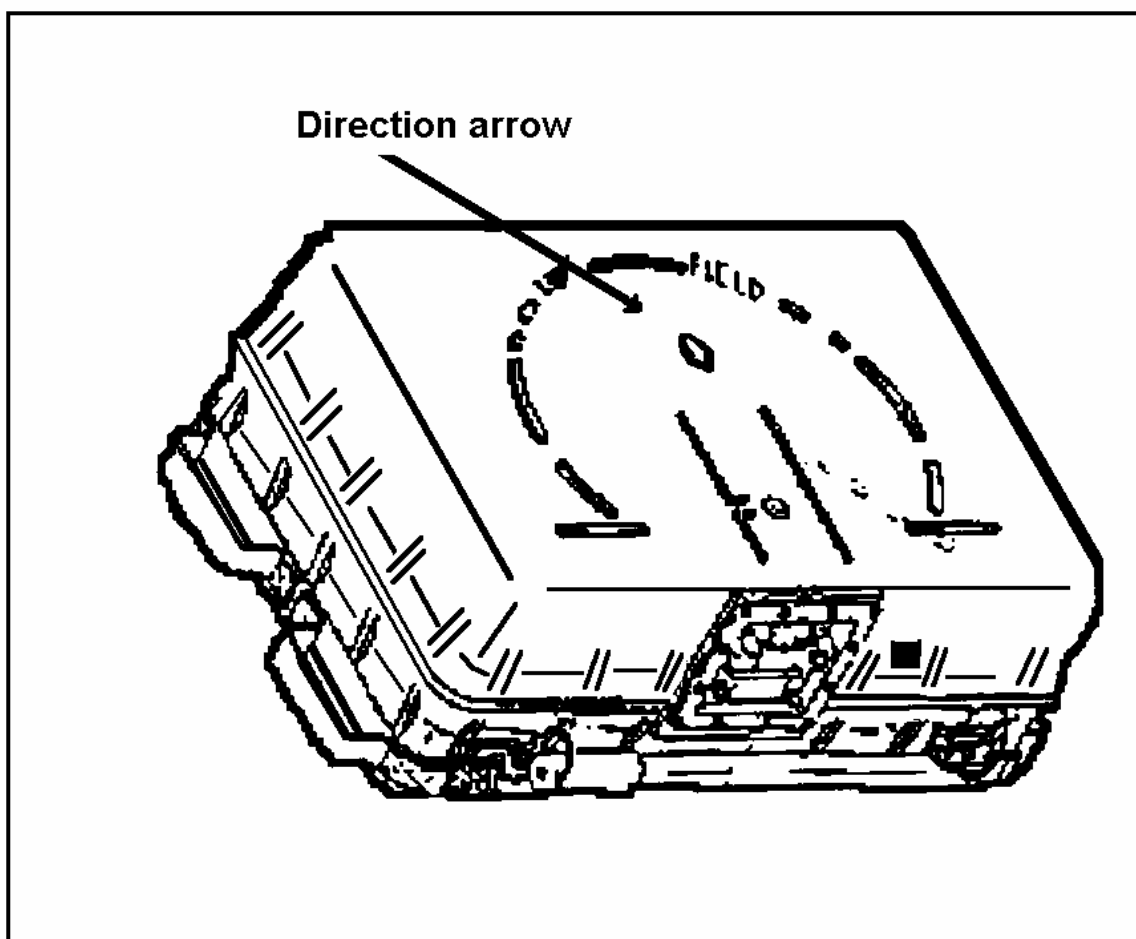


Figure 052-192-1232-1  
Dispenser

2. Lay out the firing wire.

**WARNING:** ENSURE THAT THE DISPENSER SAFE/ARM SWITCH IS SET IN THE SAFE POSITION BEFORE ATTACHING THE WIRES TO THE BINDING-POST TERMINALS.

- a. Twist the leads together at one end of the firing wire.

**Performance Steps**

- b. Lay out the firing wire, beginning at the dispenser and running to the control point (firing position). Ensure that the twisted end of the firing wire is at the control point.

- 3. Perform a continuity test.

**DANGER: DO NOT CHECK THE CONTINUITY OF THE WIRE WHEN IT IS ATTACHED TO THE DISPENSER. THE TESTER COULD DEPLOY MINES.**

- a. Return to the dispenser.
- b. Connect the field wires to the test-set binding posts (Figure 052-192-1232-2).

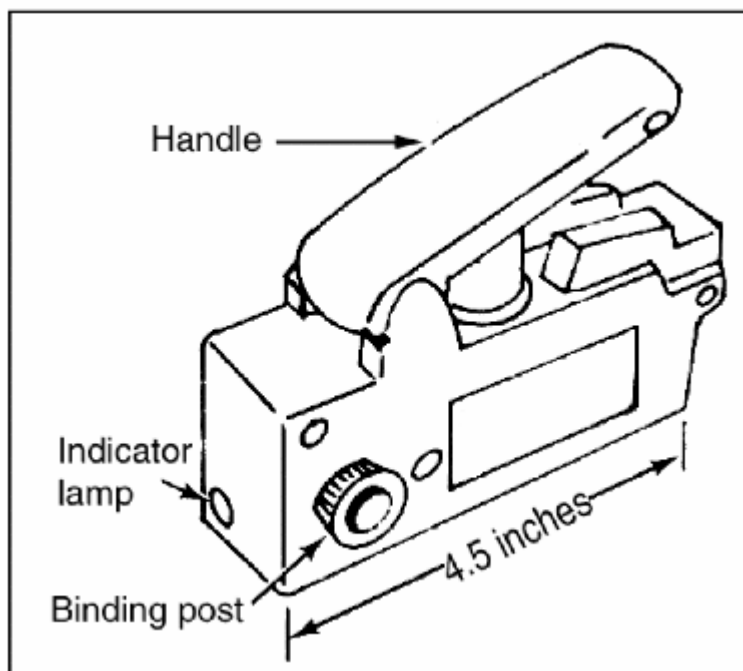


Figure 052-192-1232-2  
M51 Test Set

- c. Squeeze the handle (Figure 052-192-1232-2).
  - d. Observe the indicator lamp (Figure 052-192-1232-2). The lamp must flash for proper continuity. If the lamp does not flash, notify the noncommissioned officer in charge (NCOIC) immediately.
- 4. Perform a dispenser container test.
    - a. Set the dispenser SAFE/ARM switch to the SAFE position (Figure 052-192-1232-3).



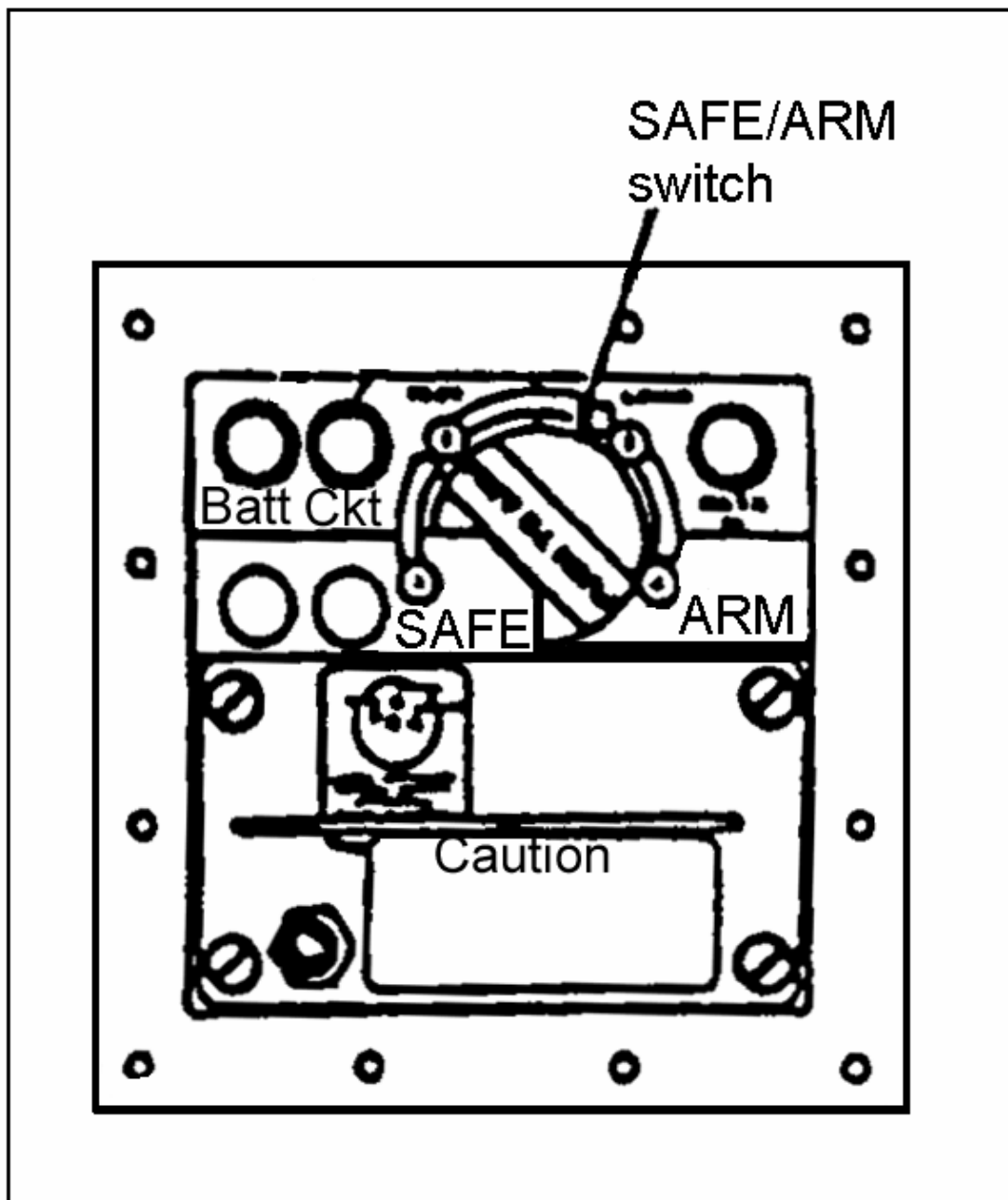
**Performance Steps**

Figure 052-192-1232-3  
Dispenser Control Face

- b. Verify that the battery (BATT OK) and circuit (CKT OK) indicator lights are on. If the lights are not on, notify the NCOIC immediately.
  - c. Set the dispenser SAFE/ARM switch to the SAFE position.
5. Connect the firing wire to the dispenser.

**Performance Steps**

- a. Ensure that the SAFE/ARM switch is in the SAFE position.
  - b. Connect the wires to the indicator-control (IC) hardware terminals.
  - c. Ensure that the bare wires do not short (touch) the IC in any way.
6. Set the dispenser SAFE/ARM switch to the ARM position.
    - a. Push in the switch and rotate it clockwise one-quarter of a turn.
    - b. Return to the firing point.

NOTE: The squad leader or team leader connects the blasting machine to the firing wire and deploys the mine when given the command.

**Evaluation Preparation:** Set up: Provide the soldier with the items listed in the conditions. If the system will be moved, ensure that three other personnel are available to assist the evaluated soldier. Use inert equipment when performing this task. Observe the soldier for any improper procedures that may cause the system to detonate.

Brief soldier: Ensure that the soldier understands that he will be evaluated on the remaining performance steps of this task once the system is in place.

**Performance Measures**

	<u><b>GO</b></u>	<u><b>NO GO</b></u>
1. Transported the dispenser to the designated location.	—	—
2. Laid out the wire, beginning at the dispenser and running to the control point.	—	—
3. Performed a continuity test on the firing wire.	—	—
4. Performed a dispenser container test.	—	—
5. Connected the firing wire to the dispenser.	—	—
6. Set the dispenser SAFE/ARM switch to the ARM position and returned to the firing point.	—	—

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

**References****Required****Related**

FM 20-32

FM 5-34

TM 9-1345-209-10

## Identify the Components of a Multiple-Delivery Mine System (Volcano)

**052-192-1233**

**Conditions:** As a combat engineer squad member in a field environment, given Technical Manual (TM) 9-1095-208-10-1 and a Volcano (mounted or unmounted).

**Standards:** Identify the components of the Volcano using TM 9-1095-208-10-1. Ensure that there are no unidentifiable or missing components preventing proper system assembly, mounting, or operation. Report any unidentifiable or missing components to the noncommissioned officer in charge (NCOIC).

### Performance Steps

NOTE: Reference TM 9-1095-208-10-1 and identify Volcano components.

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions. This task may be manipulated to show missing system components.

Brief soldier: Tell the soldier that he will be required to complete the performance measures according to the standards set forth in this task.

### Performance Measures

	<u><b>GO</b></u>	<u><b>NO GO</b></u>
1. Referenced TM 9-1095-208-10-1 and identified Volcano components.	_____	_____
2. Reported all unidentifiable or missing components to the NCOIC.	_____	_____

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

### References

#### Required

TM 9-1095-208-10-1

#### Related

## Subject Area 2: Basic Demolitions

**Neutralize Booby Traps****052-193-1013**

**Conditions:** As a combat engineer squad member in a field environment, given a suspected booby trapped area, explosives, demolition equipment, a grapnel hook attached to 50 meters of rope, and a standard booby trap marking sign.

**Standards:** Locate the booby trap, and neutralize it or mark it with the materials provided, without causing injury to personnel.

**Performance Steps**

1. Detect booby traps without activating them.
  - a. Detect booby traps in outside areas.
    - (1) Look for explosive and nonexplosive traps at and above ground level.
    - (2) Look for hidden traps near litter, unused construction material, and any movable, valuable, or useful items.
    - (3) Look for disturbed ground, unusual marks on the ground, and weathered camouflaged materials.
    - (4) Search for traps around machinery and abandoned vehicles.
    - (5) Probe to locate firing devices.
    - (6) Look and feel carefully for trip wires.
  - b. Detect booby traps inside buildings.
    - (1) View the inside of the building or room from the outside before entering, whenever possible.
    - (2) Work from the lowest level up, if possible.
    - (3) Investigate electrical circuits before turning switches, connecting broken wires, or using electrical appliances.
    - (4) Look carefully where you are walking. Inspect loose tiles, floorboards, or carpets. These items may conceal traps with pressure fuses.
    - (5) Look carefully for release fuses or wires attached to pull fuses. Do this before moving pictures, furniture, boxes, drawers, and other items you find indoors.
    - (6) Check the inside of fireplaces, stoves, furnaces, flues, and dead-air spaces for booby traps.
2. Identify detonation devices.
  - a. Detonate explosives. Use the following information to identify the six types of detonation actions:
    - (1) Pressure. The downward force of a man's foot or the wheel or track of a vehicle activates a fuse (Figure 052-193-1013-1).

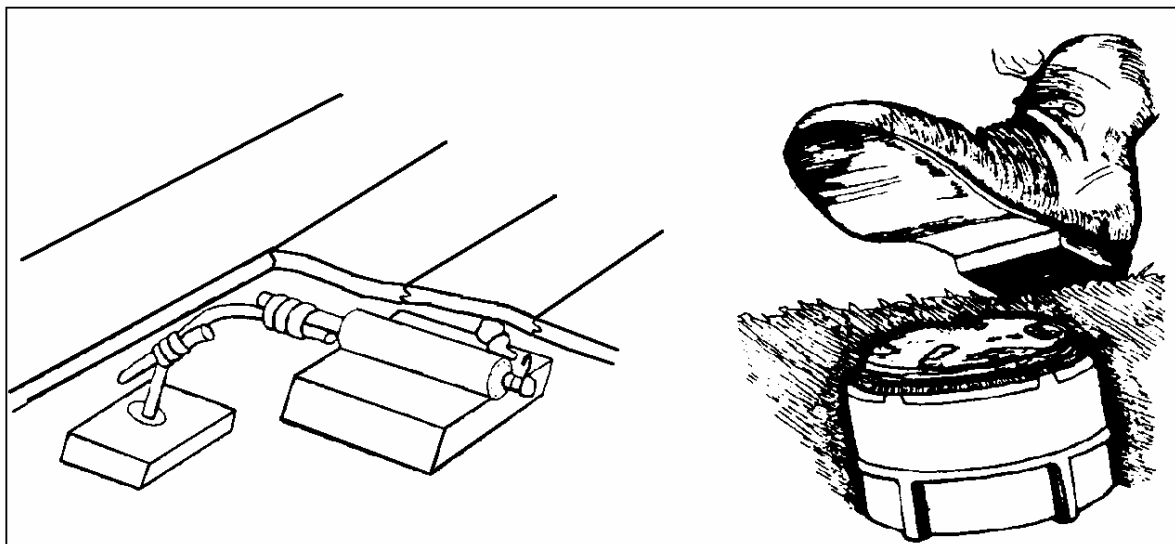
**Performance Steps**

Figure 052-193-1013-1  
Weight Activation

- (a) The pressure method is activated by a downward force of a soldier's weight, a vehicle wheel, or a similar source.
  - (b) The amount of pressure usually cannot be determined.
  - (c) The activation device can be pressure prongs, a pressure plate, or any other kind of pressure-activated switch.
- (2) Pull. The pull on the trip wire attached to the fuse activates the fuse (Figure 052-193-1013-2.)

## Performance Steps



Figure 052-193-1013-2  
Trip-Wire Activation

- (a) Trip wires should be looked for and felt for.
  - (b) Trip wires may be tied between fixed objects and the initiating source.
  - (c) Trip wires may be located anywhere between ankle and neck high on the average-height soldier.
  - (d) Trip wires are usually camouflaged in the same color as their surroundings.
  - (e) Trip wires may be strung at different angles to avoid detection and provide optimum employment against the enemy.
  - (f) Trip wires on a pull employment method of a booby trap can usually be identified by the trip wire being slightly slack or loose.
- (3) Tension release. Releasing the tension activates the fuse. Cutting a trip wire is an example of tension release (Figure 052-193-1013-3).

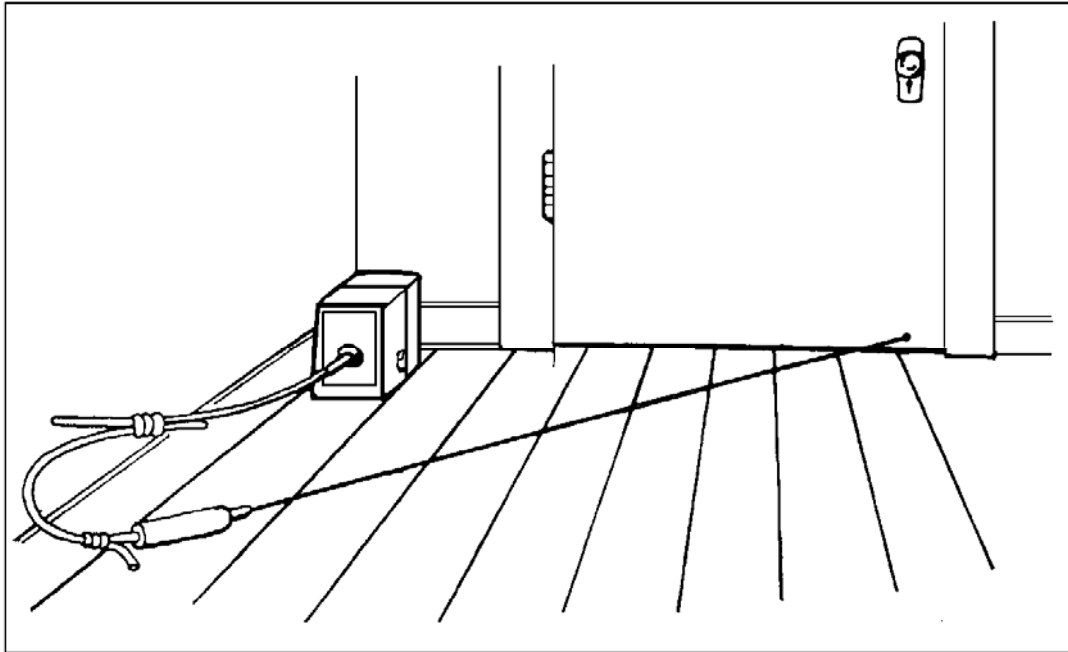
**Performance Steps**

Figure 052-193-1013-3  
Tension-Release Activation

(4) Pressure release. Removing weight activates the fuse (Figure 052-193-1013-4).

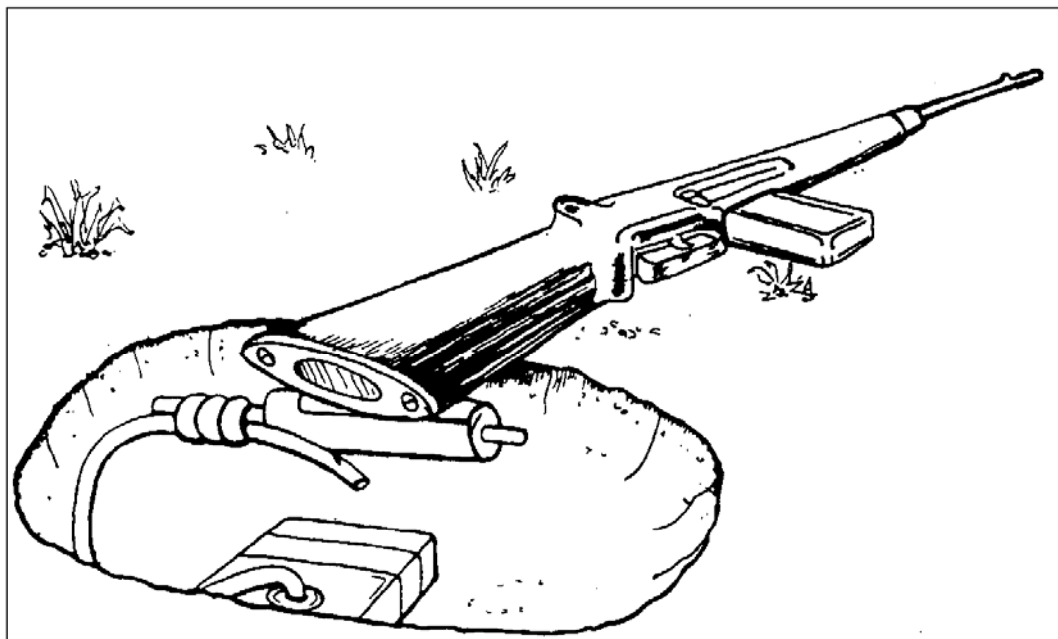
**Performance Steps**

Figure 052-193-1013-4  
Pressure-Release Activation

- (a) The pressure release is activated by removing a weighted object from the activating mechanism.
  - (b) The objects can be anything. It is usually something of interest or value to the unsuspecting soldier, such as war trophies (weapons, binoculars, knives, and so forth), possible intelligence items (maps, documents, and so forth), or anything to draw attention to the object.
- (5) Electrical. Closing an electrical circuit activates the fuse (Figure 052-193-1013-5).



## Performance Steps

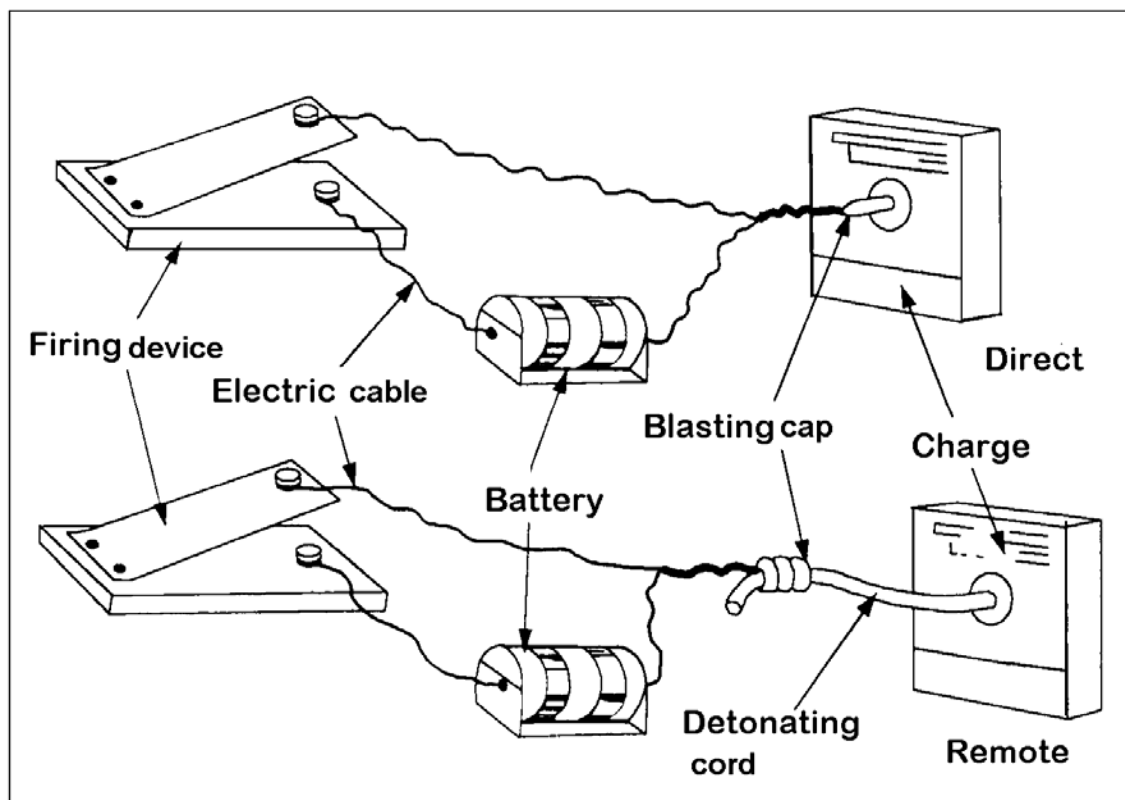


Figure 052-193-1013-5  
Electrical Activation

- (a) The electrical circuit consists of a power source, a firing mechanism (usually some form of electrical detonator), a firing wire, and an activation switch.
- (b) The power source can be in the form of a battery, electrical current from a power outlet, or generated from static electricity.
- (c) The firing wire can be any wire available to the user.
- (d) The activation switch can be in the form of something as simple as tin can lids separated by paper; a clothespin with wires wrapped around the end, or a light switch in a room.
- (e) The electrical circuit is usually camouflaged by its surroundings and is very difficult to detect without careful inspection.
- (6) Timer rundown. A timer reaching the preset time activates the fuse (Figure 052-193-1013-6).

## Performance Steps

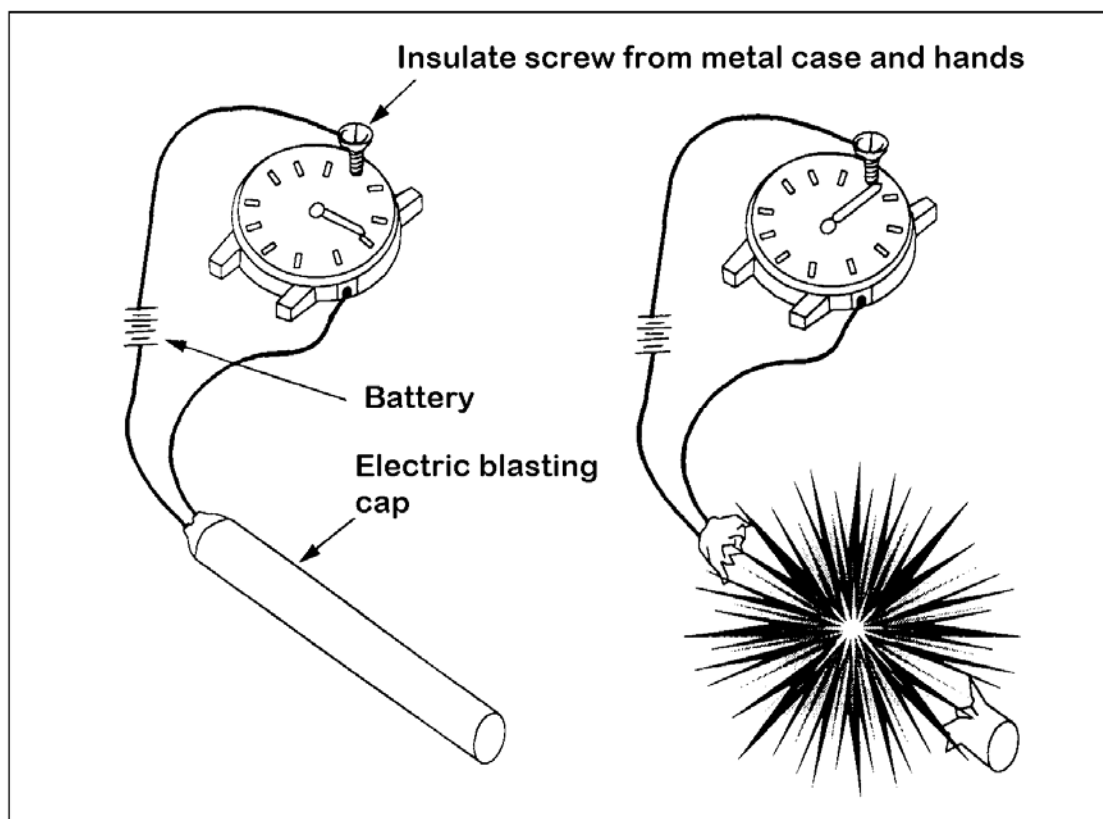


Figure 052-193-1013-6  
Time Activation

b. Initiate the following types of mechanical traps:

- (1) Passive mechanical traps have few, if any, moving parts and require the soldier to act directly against them. A camouflaged pit containing upturned spikes or scattered caltrops is an example.
- (2) Active mechanical traps have moving components and require the soldier to activate the trap. This is done by tripping a latch, pulling a wire, or releasing a counterweight. Examples of active mechanical traps are bamboo whips, snares, bear traps, or swing maces (Figure 052-193-1013-7).

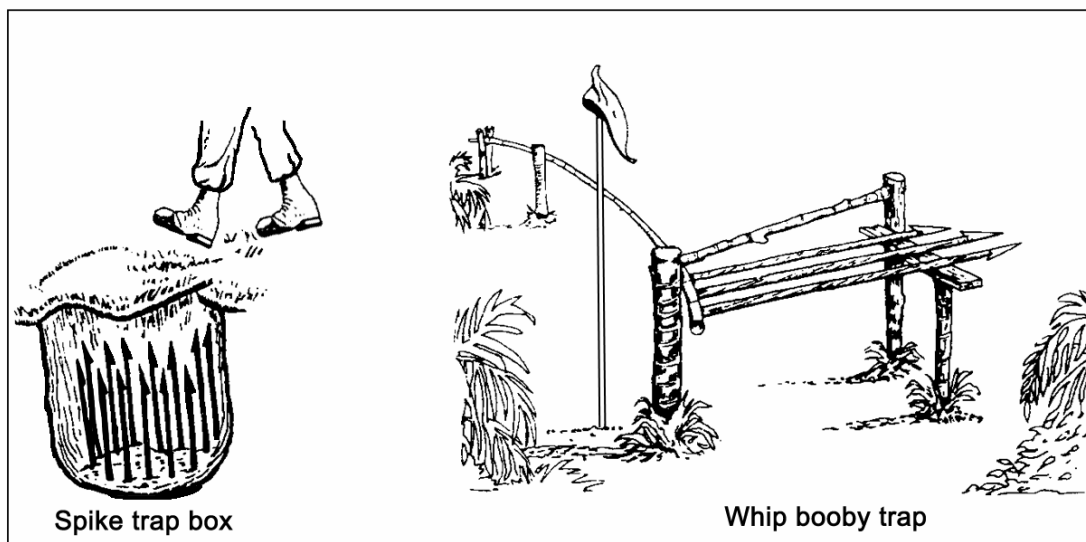
**Performance Steps**

Figure 052-193-1013-7  
Mechanical Activation

**CAUTION:** ENSURE THAT FRIENDLY PERSONNEL ARE AT A SAFE DISTANCE BEFORE NEUTRALIZING BOOBY TRAPS.

3. Neutralize booby traps.

**NOTE:** Report the location, type of traps, and any unique method used to the noncommissioned officer in charge (NCOIC).

a. Neutralize traps by activating or blocking the firing chain and/or the mechanical sequence.

- (1) Activate the firing chains and/or mechanical sequences using a rope or wire that is at least 50 meters long. Hook or tie one end of the rope to the trip wires, pins, or restraining weights. Move to a protected position (at least 50 meters away) and pull the other end of the rope (Figure 052-193-1013-8). Wait at least 5 minutes before approaching a trap that did not detonate or operate.

## Performance Steps

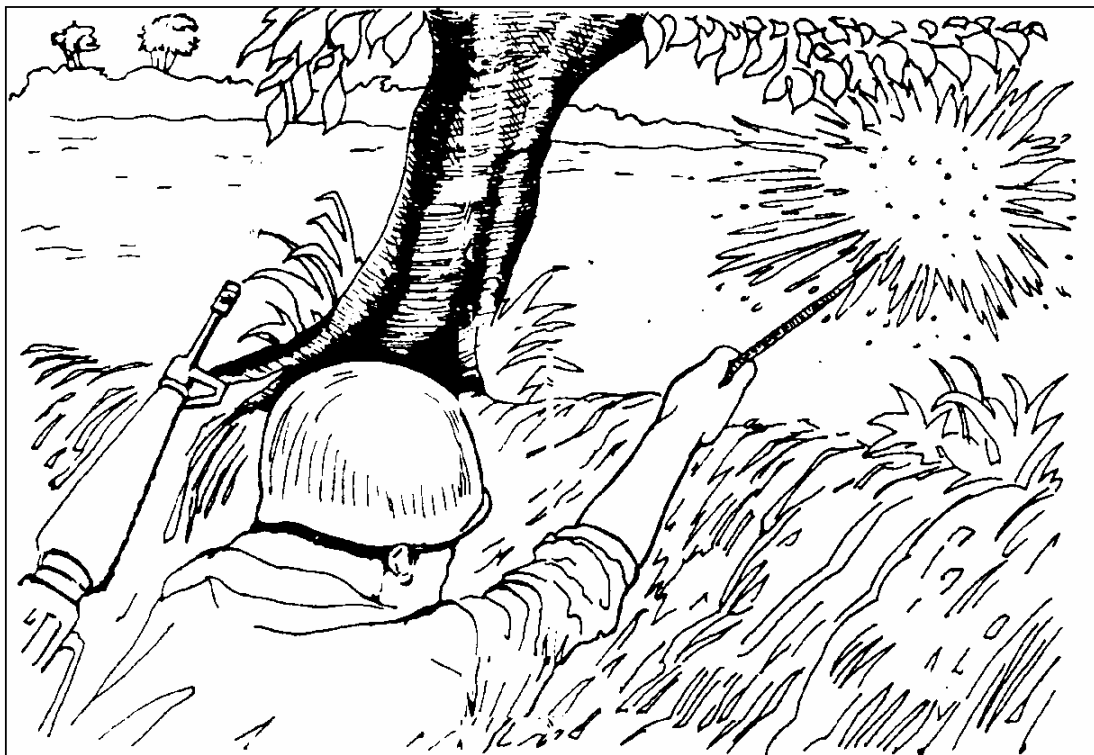


Figure 052-193-1013-8  
Neutralizing a Booby Trap

- (2) Block firing chains and/or a mechanical sequence by cutting slack trip wires and electrical conductors or by replacing the safety pins.

NOTE: You can neutralize passive mechanical traps by scraping the ground, filling the pit, or removing or breaking spikes and blades.

- b. Destroy traps in place by detonating a 1-pound explosive charge next to the main charge. Place a 1-pound explosive charge within 6 inches of, but not touching, the main charge of the booby trap.
  - c. Neutralize passive mechanical booby traps by filling in the pit or by breaking spikes, blades, and so forth.
4. Mark all booby traps that cannot be destroyed at the time of detection. Mark the traps with a standard sign, or use an expedient marker as designated by the unit (Figure 052-193-1013-9).

## Performance Steps

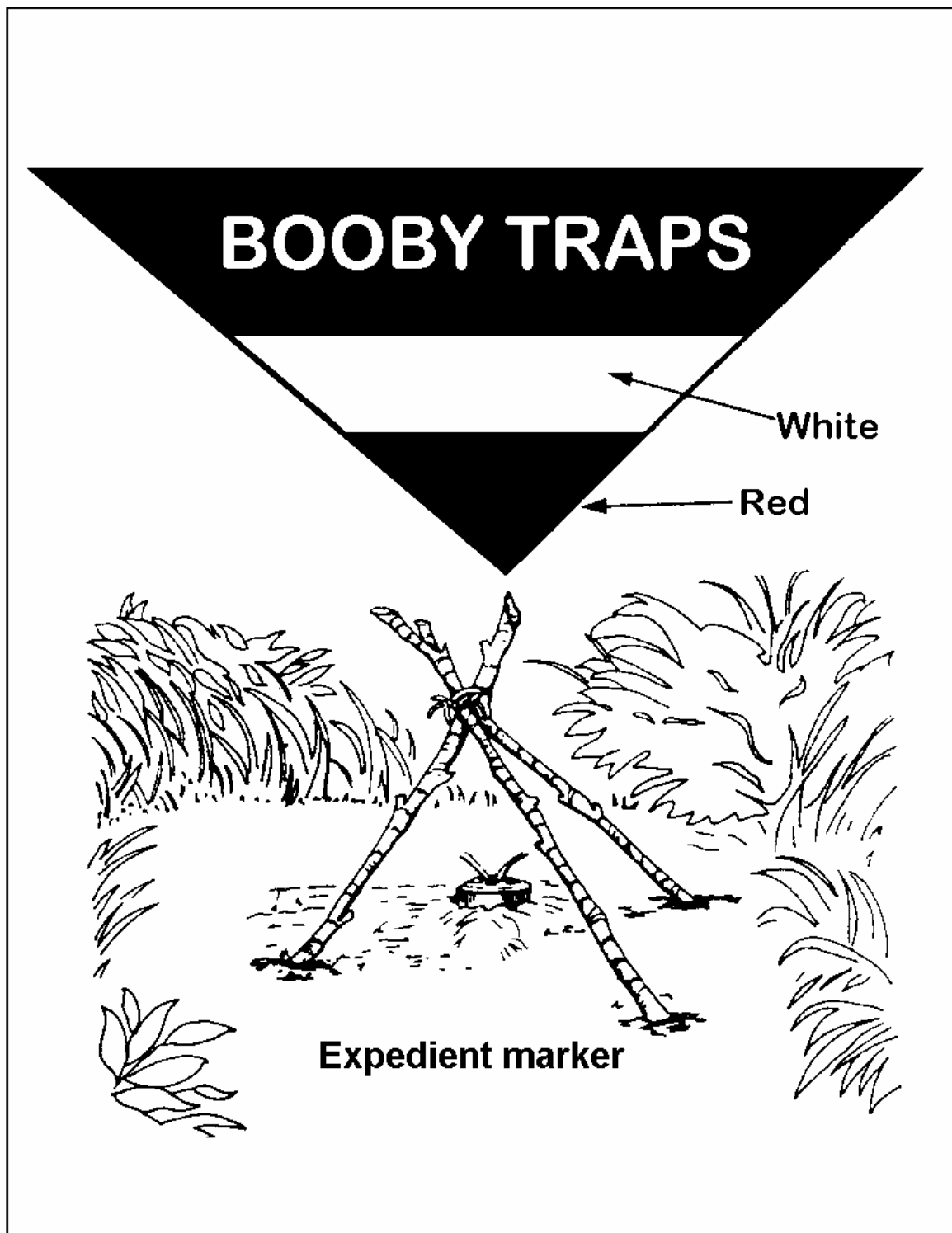


Figure 052-193-1013-9  
Standard Booby-Trap Sign

**Performance Steps**

NOTE: The standard booby trap sign is a red triangle with a 3-inch, white circle in the center. The word "booby traps" will be spelled out in white letters across the top of the sign. The sign will be placed so that the right-angled apex is pointing down.

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions statement.

Brief soldier: Tell the soldier to identify the booby trap and mark it if it cannot be neutralized.

**Performance Measures**

	<b><u>GO</u></b>	<b><u>NO GO</u></b>
1. Detected booby traps without activating them.	_____	_____
2. Identified detonation devices.	_____	_____
3. Neutralized booby traps.	_____	_____
4. Marked all booby traps that could not be destroyed at the time of detection.	_____	_____

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

**References**

**Required**

**Related**

FM 20-32

### Install an M142 Multipurpose Firing Device 052-193-1101

**Conditions:** As a combat engineer squad member in a field environment, given a complete M142 multipurpose firing device (MPFD); an M15 or M19 antitank (AT) mine with an M1 or an M2 activator; a standard base; an entrenching tool; a flat, solid object (wood or rock); and a suitable working area.

**Standards:** Install an M142 MPFD in the pressure-release mode on a mine without activating the MPFD prematurely.

#### Performance Steps

1. Install the M15 or M19 AT mine.
  - a. Inspect the mine and the appropriate fuse or detonator.
  - b. Install the fuse or the detonator in the mine.
  - c. Dig a hole to fit the mine, with a trench coming off of the side at about a 45-degree angle toward the friendly side (Figure 052-193-1101-1).

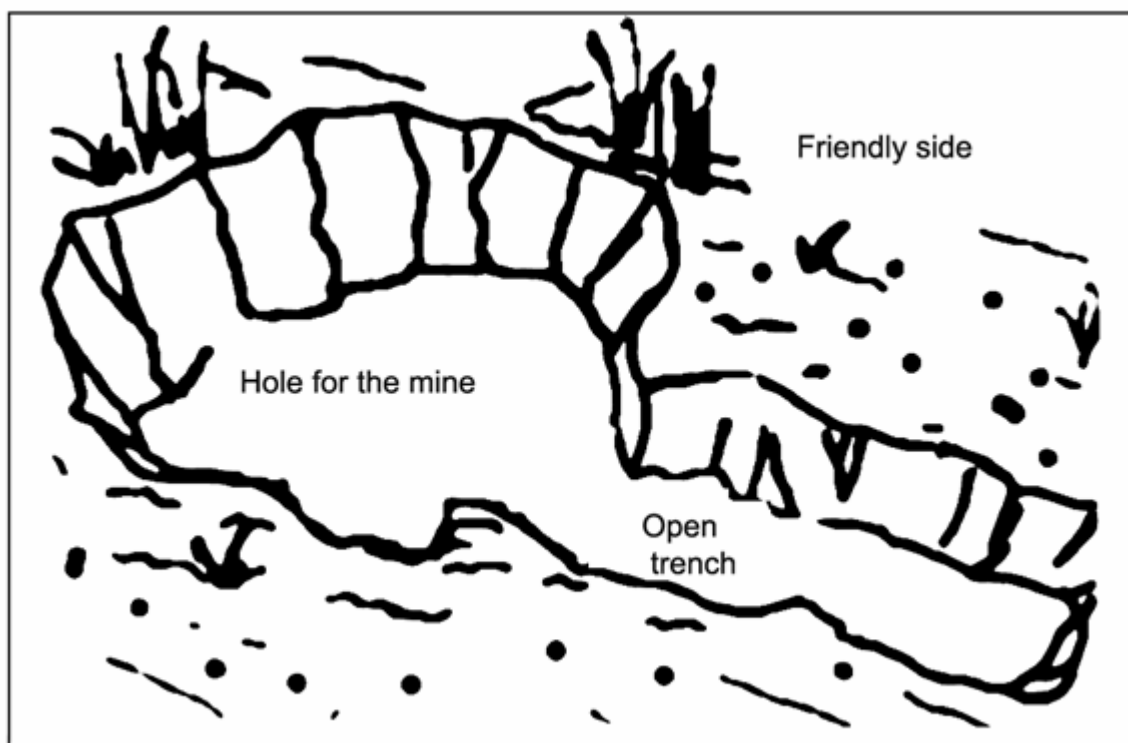


Figure 052-193-1101-1  
Hole for the Mine With an Open Trench

2. Install the M142 MPFD in the pressure-release mode.

**WARNING: HANDLE THE MPFD WITH CARE DURING ASSEMBLY. FAILURE TO DO SO COULD RESULT IN DETONATION.**

  - a. Inspect the firing device for damage, and check all safety pins for placement and ease of removal (Figure 052-193-1101-2).

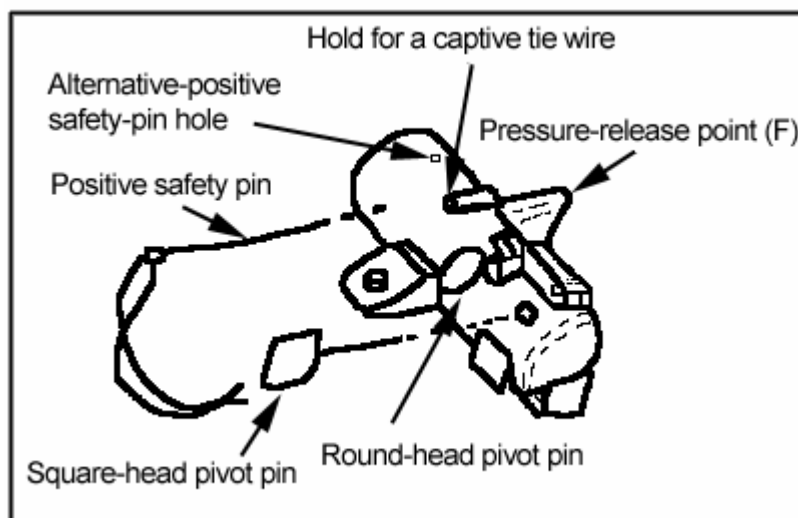
**Performance Steps**

Figure 052-193-1101-2  
M142 in the Pressure-Release Mode

- b. Screw the standard base into the firing device (Figure 052-193-1101-3).

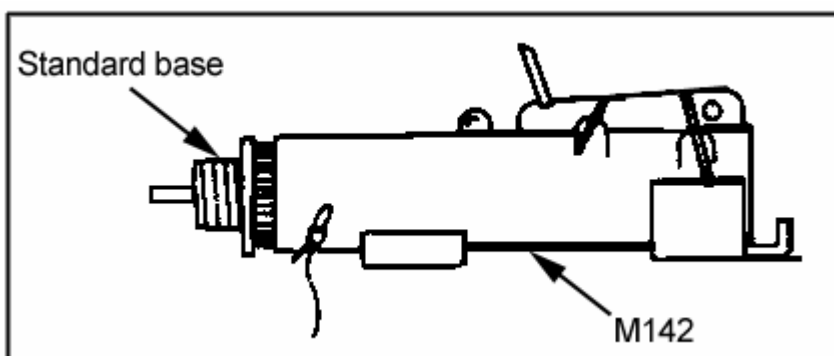


Figure 052-193-1101-3  
Standard Base to a M142

- c. Screw the firing device and standard base into the M1 or M2 activator (Figure 052-193-1101-4).



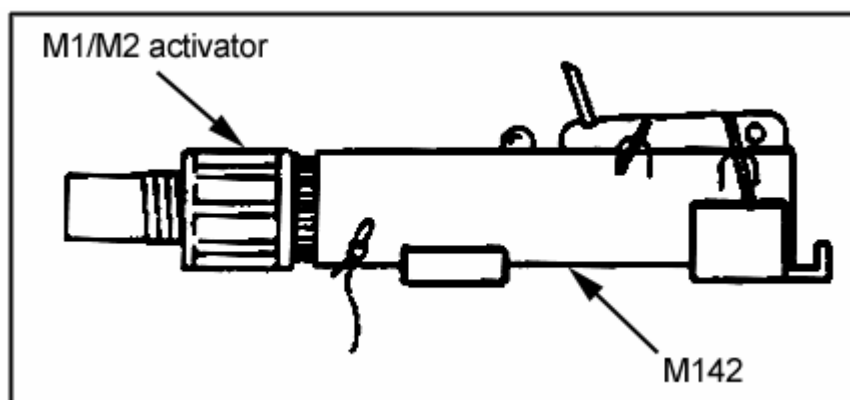
**Performance Steps**

Figure 052-193-1101-4  
M142 and Standard Base With M1/M2 Activator

NOTE: Use the M1 activator with the M15 AT mine, and use the M2 activator with the M19 AT mine.  
d. Screw the firing device, standard base, and activator into the side well of the mine (Figure 052-193-1101-5).

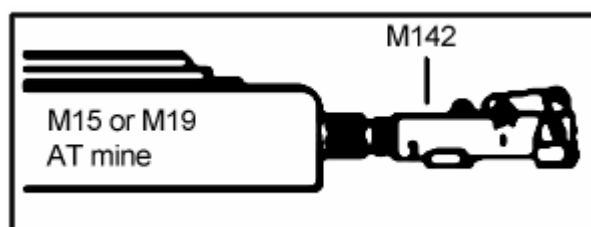


Figure 052-193-1101-5  
Attaching the Firing Device, Standard Base, and Activator

- e. Place the mine and the firing device in the hole. Ensure that the safety pins remain in place.
3. Place an object on the firing device at the pressure-release point (F) (Figure 052-193-1101-6).

## Performance Steps

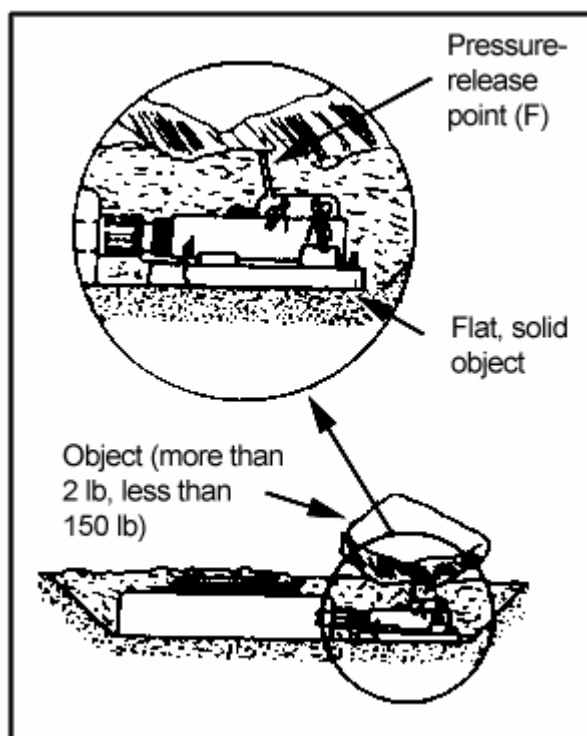


Figure 052-193-1101-6  
M142 in Pressure-Release Mode in the Side Fuse Well

NOTE: Use an object weighing at least 2 pounds but no more than 150 pounds.

4. Arm the mine. Cover and camouflage the mine up to the pressure plate. Leave the trench at the side of the mine exposed. This will give room to remove the safety pins.

5. Arm the firing device.

- a. Use a wire to carefully remove the round-head pin (pivot pin), when necessary.

WARNING: IF YOU FEEL A JAR OR HEAR A METALLIC CLICK, STOP AND NOTIFY THE NONCOMMISSIONED OFFICER IN CHARGE (NCOIC). THIS IS A RESULT OF THE FIRING PIN GOING FORWARD AND RESTING ON THE POSITIVE SAFETY PIN. DO NOT REMOVE THE POSITIVE SAFETY PIN.

- b. Remove the positive safety pin.

WARNING: IF THE POSITIVE SAFETY PIN IS DIFFICULT TO REMOVE, STOP AND NOTIFY THE NCOIC.

6. Finish camouflaging the mine and give the safety pins to the NCOIC.

**Evaluation Preparation:** Setup: Provide the soldier with the items in the conditions statement. The soldier will install the M15 AT mine or the M19 AT mine.

Brief soldier: Ensure that the soldier has the proper fuse or detonator, an arming wrench, and the appropriate activator for the mine being installed. Use inert equipment when performing this task.

## Performance Measures

1. Installed the M15 or M19 AT mine.
2. Installed the M142 MPFD in the pressure-release mode.

GO      NO GO

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\_\_\_\_\_

**Performance Measures**

3. Placed an object on the firing device at the pressure-release point (F).
4. Armed the mine
5. Armed the firing device.
6. Finished camouflaging the mine and gave the safety pins to the NCOIC.

**GO**    **NO GO**

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**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

**References****Required****Related**

FM 20-32

FM 5-250

FM 5-34

TM 9-1375-213-12

## Remove an M142 Multipurpose Firing Device

### 052-193-1102

**Conditions:** As a combat engineer squad member in a field environment, given the location of an emplaced M15 or M19 antitank mine (AT) with an attached M142 multipurpose firing device (MPFD), safety pins, and a sandbag.

**Standards:** Remove the M142 MPFD from the mine, in the proper sequence, without detonating the mine.

#### Performance Steps

WARNING: DISARMING AN ARMED FIRING DEVICE IS CONSIDERED HAZARDOUS. ALL UNNECESSARY PERSONNEL MUST LEAVE THE AREA DURING DISARMING PROCEDURES. BEFORE ATTEMPTING TO DISARM AND REMOVE THE MINE, CHECK FOR PRESSURE PRONGS, TILT RODS, TRIP WIRES, AND ANY OTHER TYPE OF BOOBY TRAP. IF ANY OF THESE CONDITIONS EXIST, NOTIFY THE NONCOMMISSIONED OFFICER IN CHARGE (NCOIC) AND DO NOT ATTEMPT TO DISARM THE MINE.

1. Locate the mine by visual means or by using the AN/PSS-12 mine detector.
2. Locate the firing device.  
WARNING: DO NOT APPLY PRESSURE TO THE MINE'S PRESSURE PLATE AT ANY TIME.
  - a. Clear the camouflage away from the mine.
  - b. Hold the mine firmly in place with one hand. Do not put pressure on the pressure plate.
  - c. Feel for antihandling devices (AHDs), with the other hand, by digging around the sides and underneath the mine, until the firing device is located.
3. Disarm the firing device.
  - a. Install the positive safety pin first.
  - b. Install the locking safety pin.
4. Disarm the mine by using the appropriate arming wrench.
5. Remove the mine and the firing device from the hole. Ensure that the safety pins remain in place.
6. Remove the firing device from the mine.
  - a. Ensure that the safety pins remain in place on the firing device.
  - b. Disassemble the activator and standard base from the firing device.
7. Remove the fuse or detonator from the mine.
8. Give all the components to the NCOIC.

**Evaluation Preparation:** Setup: Provide the soldier with the items in the conditions statement. The soldier will remove the M15 AT mine or the M19 AT mine.

Brief soldier: Ensure that the soldier has the proper arming wrench for the mine being disarmed. Use inert equipment when performing this task.

#### Performance Measures

	<u>GO</u>	<u>NO GO</u>
1. Located the mine by visual means or by using the AN/PSS-12 mine detector.	—	—
2. Located the firing device.	—	—
3. Disarmed the firing device.	—	—
4. Disarmed the mine by using the appropriate arming wrench.	—	—

**Performance Measures**

5. Removed the mine and the firing device from the hole.
6. Removed the firing device from the mine.
7. Removed the fuse or detonator from the mine.
8. Gave all the components to the NCOIC.

**GO**    **NO GO**

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**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

**References****Required****Related**

FM 20-32

FM 5-250

FM 5-34

TM 9-1375-213-12

## Construct Demolition Firing Systems

### 052-193-1310

**Conditions:** As a combat engineer squad member in a field environment, given military explosives, detonating cord, M11 or M16 branch lines, M12 or M13 transmission lines, M2 crimpers, a demolition knife, and sandbags.

**Standards:** Construct a demolition firing system (stand alone or combination), in sequence, without causing premature detonation.

#### Performance Steps

**NOTE:** There are two types of firing systems: a stand-alone firing system and a combination firing system. On a stand-alone firing system, the initiation set(s), transmission line(s), and branch line(s) are modernized-demolition-initiator (MDI) components and explosives are primed with MDI blasting caps. It is important that the firing system is balanced. All charges must have the same distance in the shock tube from the firing point to the charge. A combination firing system consists of the MDI initiation set; either a detonating cord line or ring main; and branch lines that can be either MDI, detonating cord, or a mix of both. The combination firing system is the preferred firing system for reserved demolition targets.

**WARNING:** DO NOT DISPOSE OF USED SHOCK TUBES BY BURNING THEM. THE SHOCK TUBES GIVE OFF POTENTIALLY TOXIC FUMES FROM THE BURNING PLASTIC.

1. Construct a stand-alone firing system.
  - a. Identify the firing point.
  - b. Emplace and secure the explosive charges on the target.
  - c. Begin with the set of charges furthest from the firing point and place a sandbag or other easily identifiable marker over the M12 blasting cap.
  - d. Unreel the M12 transmission line toward the next set of charges in the direction of the firing point.

**NOTE:** Use an M11 branch line when the distance is less than 30 feet.

- e. Place the shock tube of the first M12 in the blasting cap holder of the second M12. Cover the holder with a sandbag or another easily identifiable marker.

**NOTE:** Do not close the hinged flap of the holder.

- f. Unreel the second M12 transmission line toward the third set of charges in the direction of the firing point.
- g. Place the shock tube of the second M12 in the blasting cap holder of the third M12. Cover the holder with a sandbag or another easily identifiable marker.

**NOTE:** Continue this process for each set of charges.

**WARNING:** ENSURE THAT THE FIRING SYSTEM IS BALANCED. THE SHOCK WAVE IN THE SHOCK TUBE MUST TRAVEL THE SAME DISTANCE TO ALL CHARGES TO EFFECTIVELY PREVENT A MISFIRE.

- h. Unreel the last M12 transmission line toward the firing point, from the set of charges closest to it (Figure 052-193-1310-1).

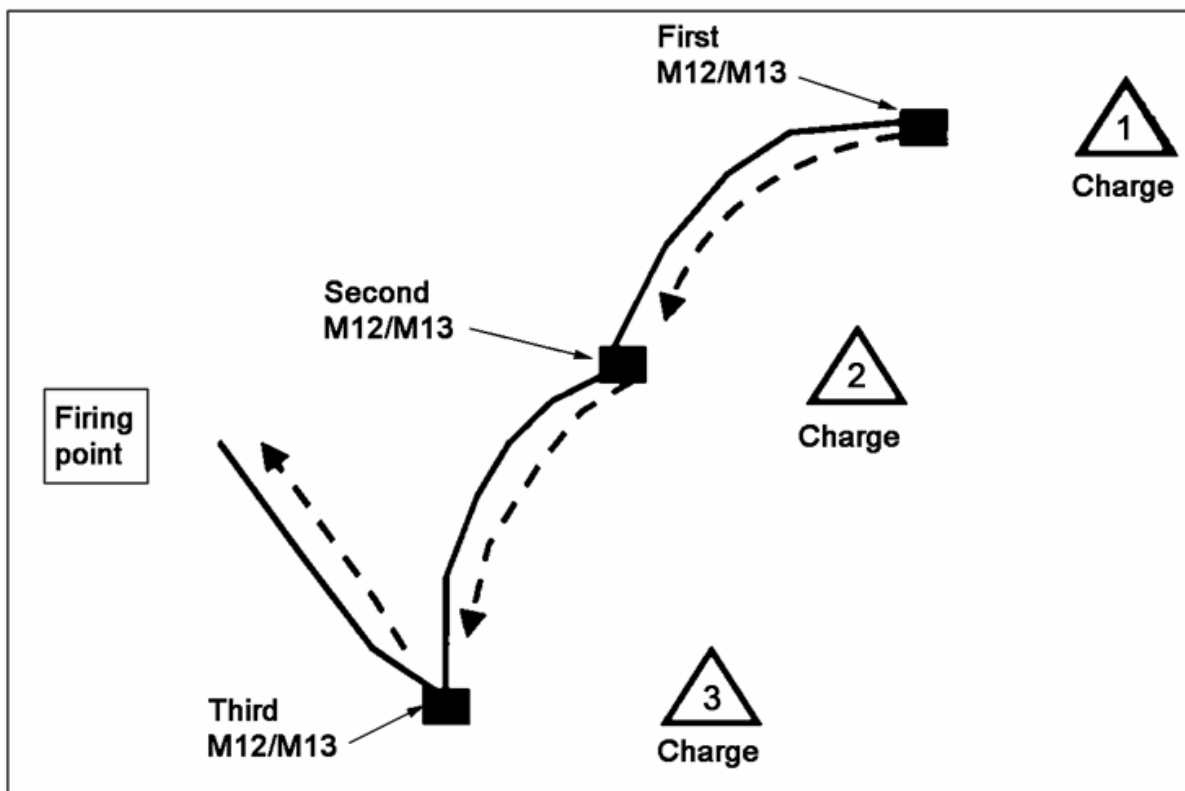
**Performance Steps**

Figure 052-193-1310-1  
Transmission Line to the Firing Line

- i. Lay out at each set of charges the M11 or M16 branch line from the charges to be primed toward the transmission line blasting-cap holder. Ensure that the M11 or M16 blasting caps are underneath a sandbag or another easily identifiable marker (Figure 052-193-1310-2).

## Performance Steps

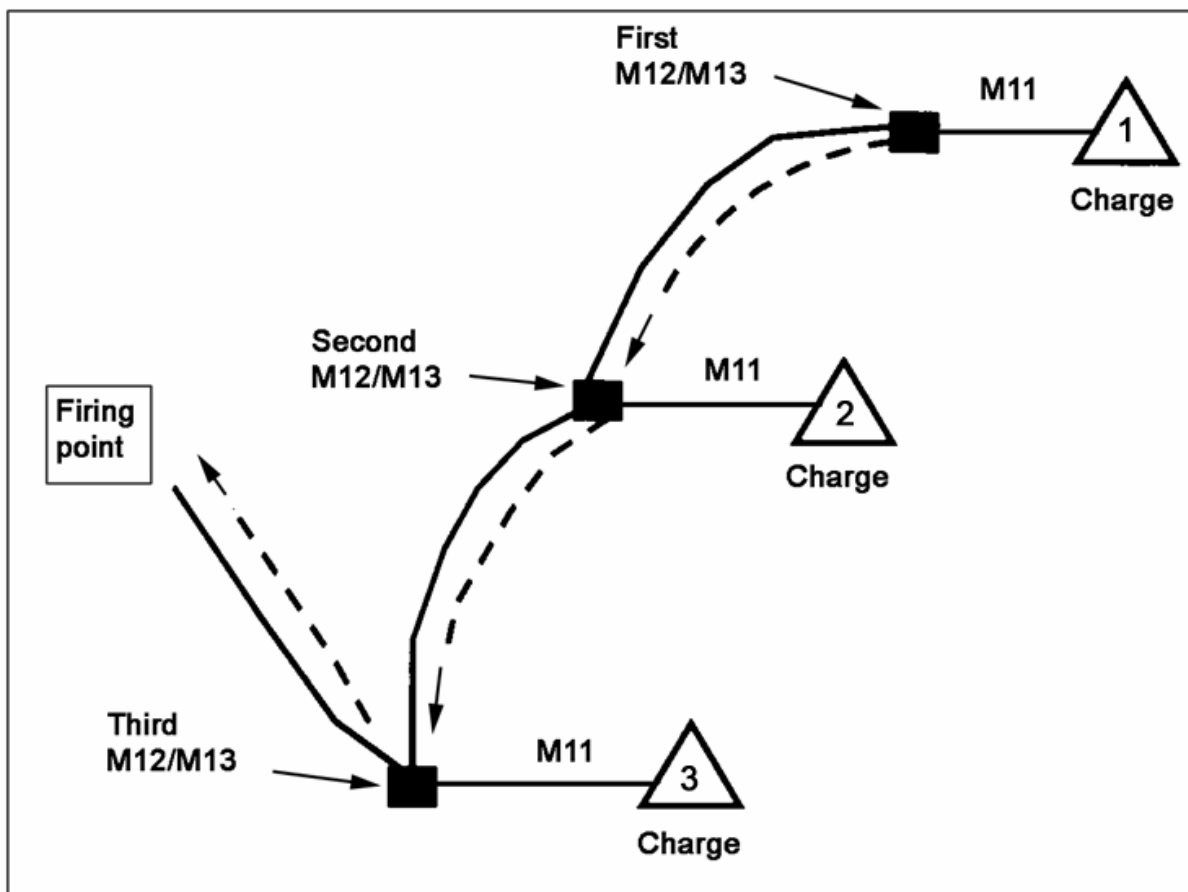


Figure 052-193-1310-2  
Branch Line Toward Transmission Line

- j. Remove the sandbag at each transmission line blasting-cap holder and insert the branch line(s) into the transmission line blasting-cap holder. Secure the transmission line and branch line(s) by taping the connector closed.

NOTE: No more than five M11 or M16 branch lines can be connected to the transmission line's blasting-cap holder. If there are more than five charges, group the branch lines from the charges, and connect them to the M9's blasting-cap holder using an M11 or M16 branch line.

NOTE: Secure all the sandbags near the firing point.

- k. Use the M11 or M16 blasting caps to prime the explosive charges.  
l. Return to the firing point, construct the initiation set(s), and prepare to initiate the system (Figure 052-193-1310-3).



## Performance Steps

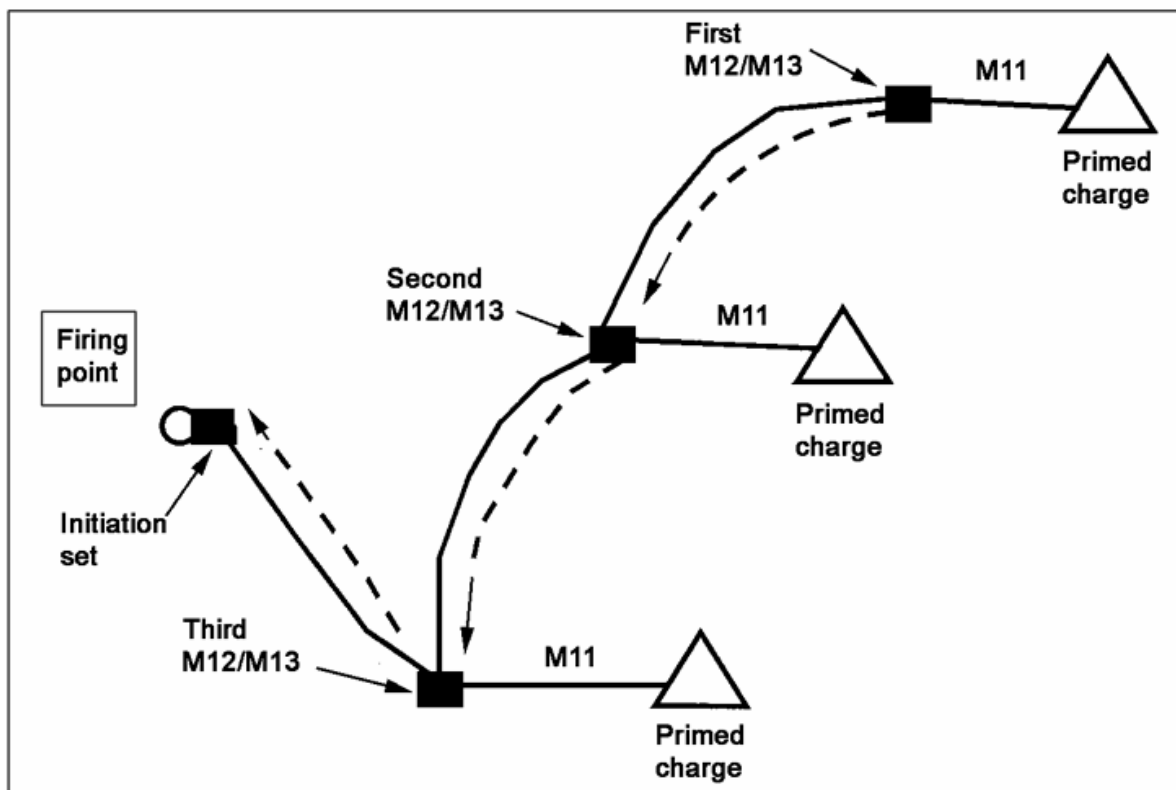


Figure 052-193-1310-3  
Initiate System

2. Construct a combination firing system.
  - a. Identify the firing point.
  - b. Emplace and secure explosive charges on the target.
  - c. Construct the detonating-cord line main or ring main.
    - (1) Line main. Lay the desired amount of detonation cord in a straight line between the charges, from the furthest charge back toward the firing point (Figure 052-193-1310-4).

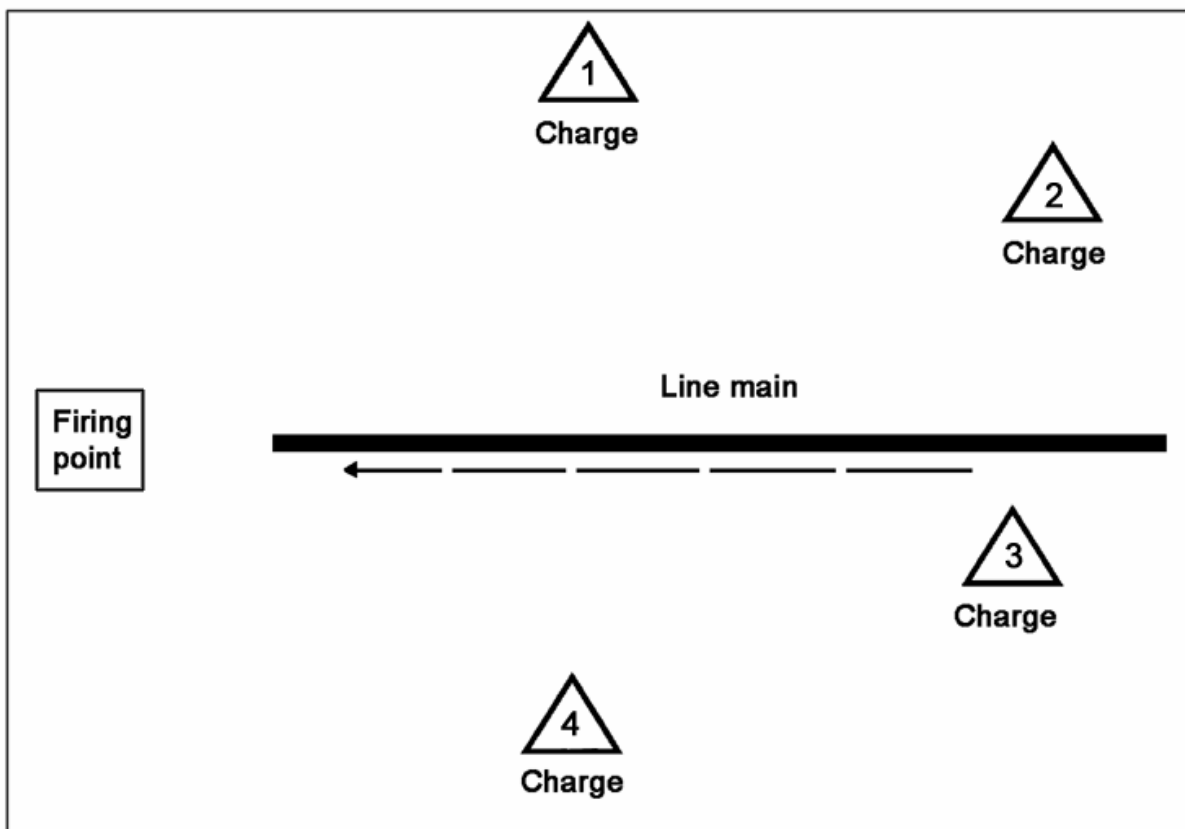
**Performance Steps**

Figure 052-193-1310-4  
Line Main

- (2) Ring main.
  - (a) Method One. Lay out the desired amount of detonating cord and form a loop. Attach the loop to itself with a girth hitch and an extra turn (Figure 052-193-1310-5).

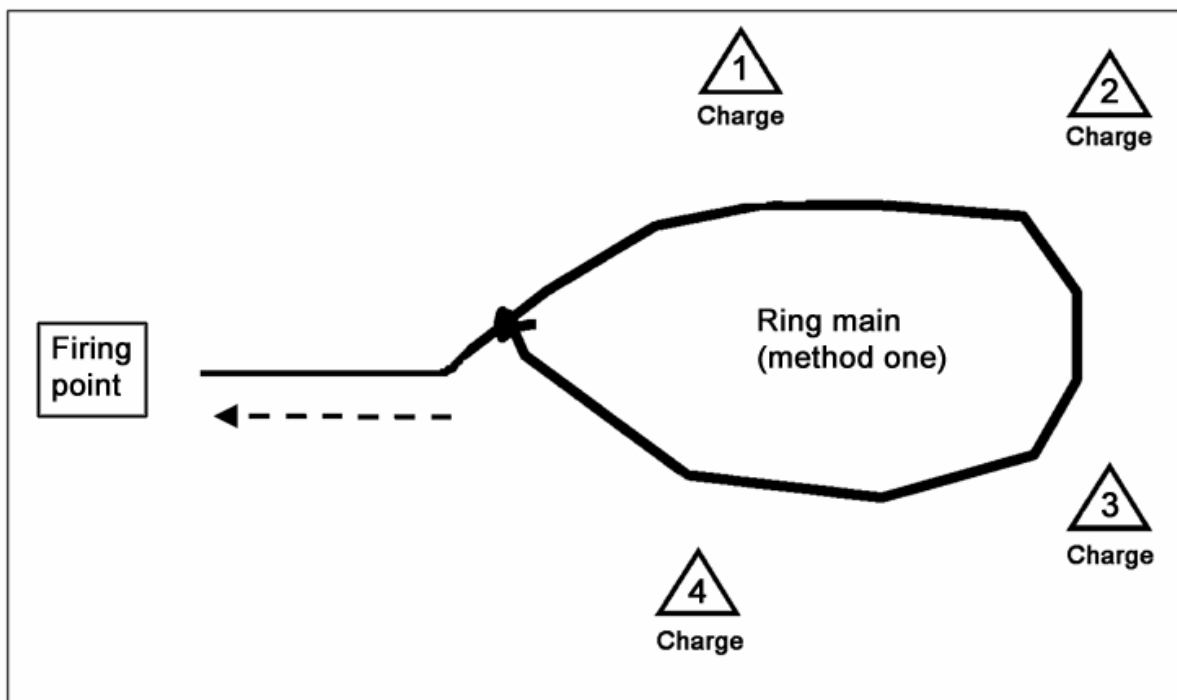
**Performance Steps**

Figure 052-193-1310-5  
Ring Main (Method One)

- (b) Method Two. Lay out the desired amount of detonating cord and form a U-shape. Lay another piece of detonating cord across the open end of the U-shape and attach the crossover ends to the U-shape with a girth hitch and an extra turn (Figure 052-193-1310-6).

## Performance Steps

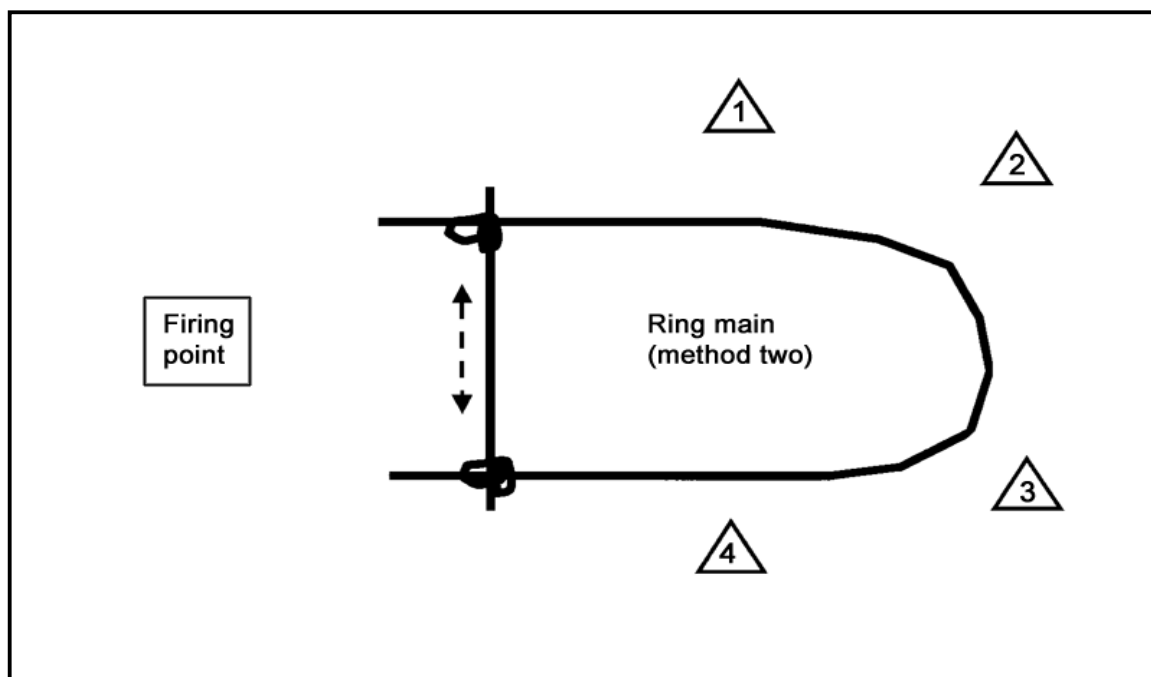


Figure 052-193-1310-6  
Ring Main (Method Two)

- d. Place the M12 or M13 blasting caps underneath a sandbag or another easily identifiable marker at the connection between the detonating-cord line main or ring main.
- e. Unreel the M12 or M13 transmission line to the firing point.
- f. Connect the branch lines.

NOTE: Branch lines must be connected perpendicular to the line main or ring main. Avoid kinks and crossing lines. Curves and angles should not be sharp. Any number of branch lines may be connected to a line main or ring main. Ensure that there is at least one foot of space between each branch-line connection. Do not connect the branch lines at the point where the ring main is connected.

- (1) Prime the explosive with detonating cord. Connect the branch line from the explosive to the line main or ring main with a girth hitch and an extra turn or an M1 detonating-cord clip. Figures 052-193-1310-7 and 052-193-1310-8 show the two methods of connection.

## Performance Steps

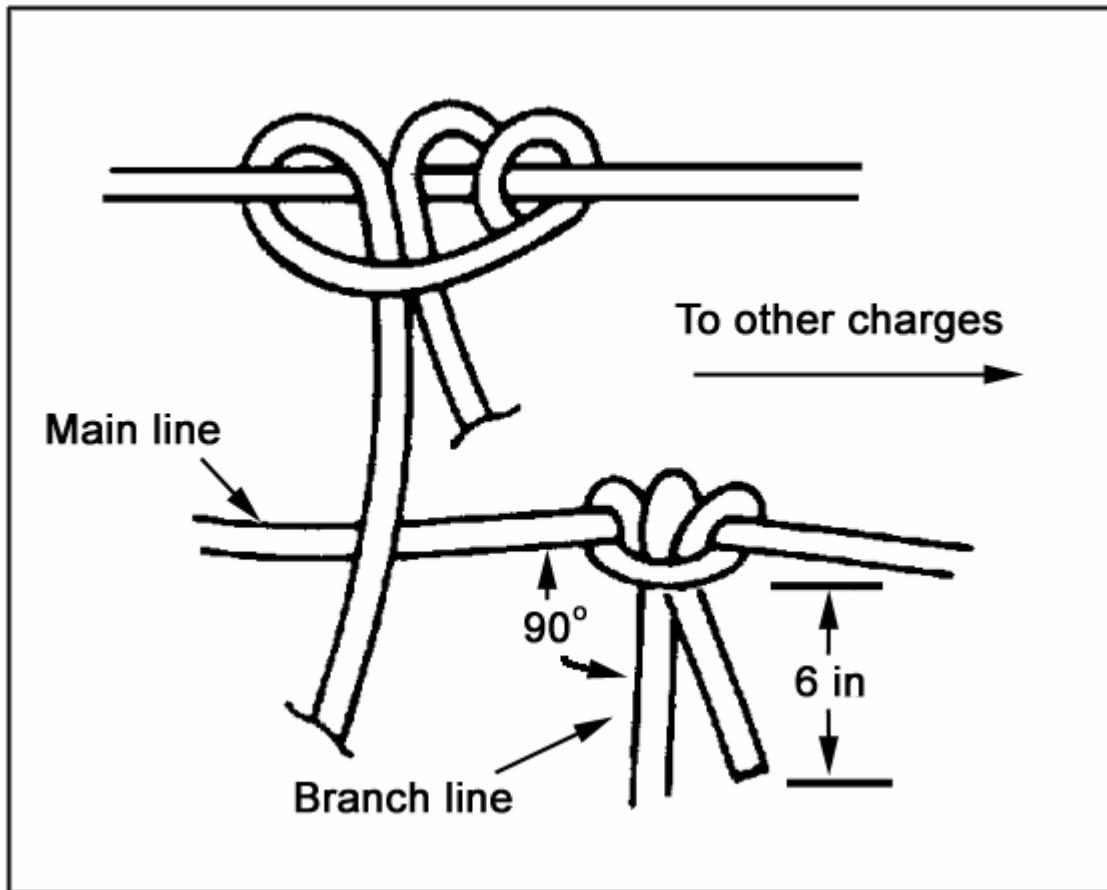


Figure 052-193-1310-7  
Girth Hitch With Extra Turns

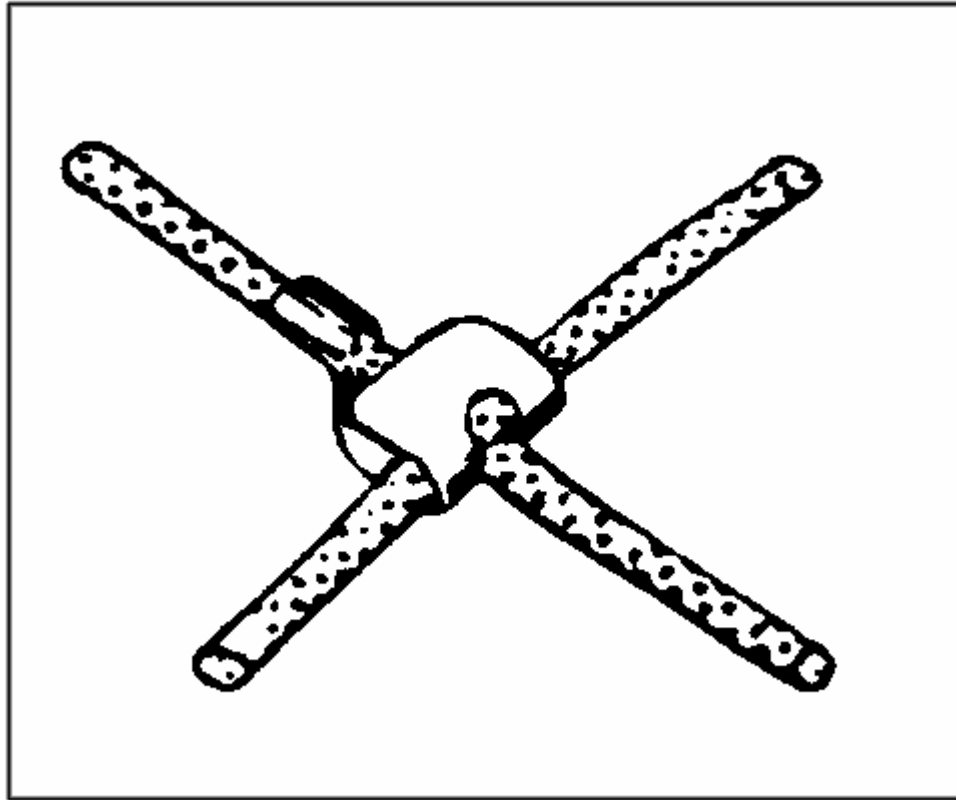
**Performance Steps**

Figure 052-193-1310-8  
M1 Detonating-Cord Clip

- (2) Use the J-hook of the M11 or M16 branch line and wrap the shock tube around and through the J-hook and pull it tight. This prevents the J-hook from slipping. Clip the J-hook to the detonating-cord line main or ring main (Figures 052-193-1310-9 and 052-193-1310-10). Prime the explosive with a M11 or M16 blasting cap.

**Performance Steps**

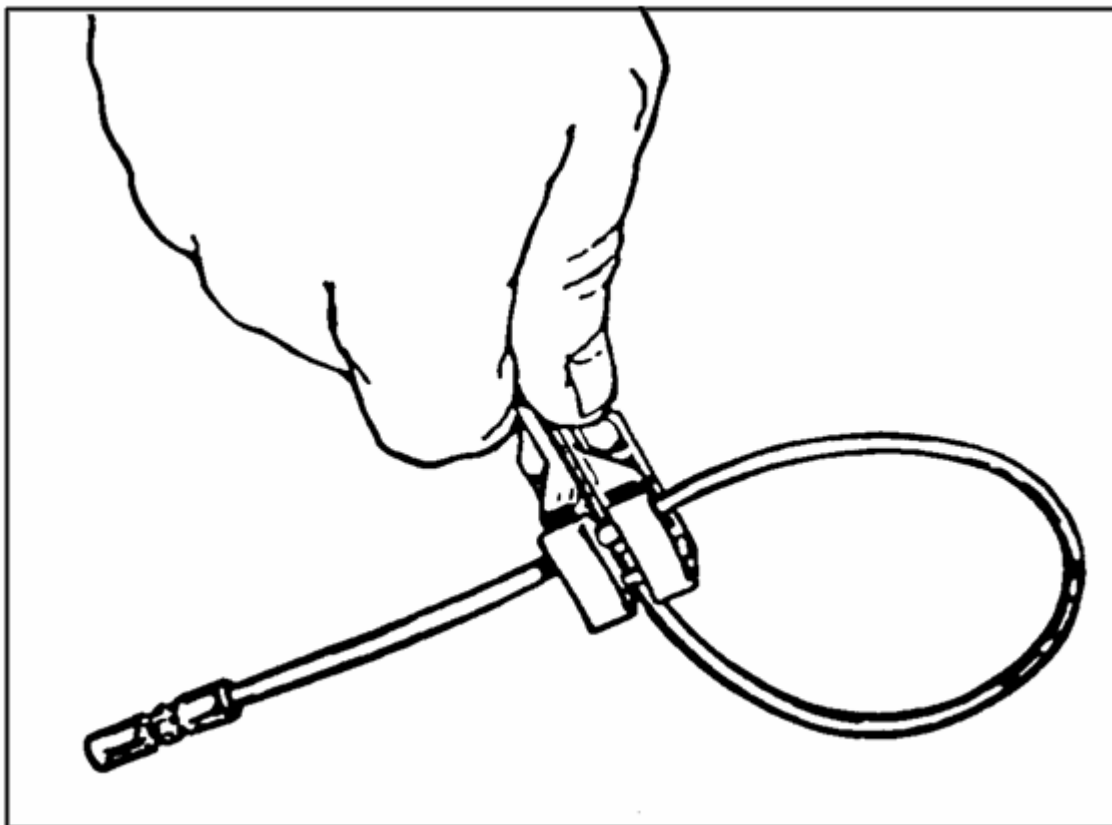


Figure 052-193-1310-9  
J-Hook Self Loop

## Performance Steps

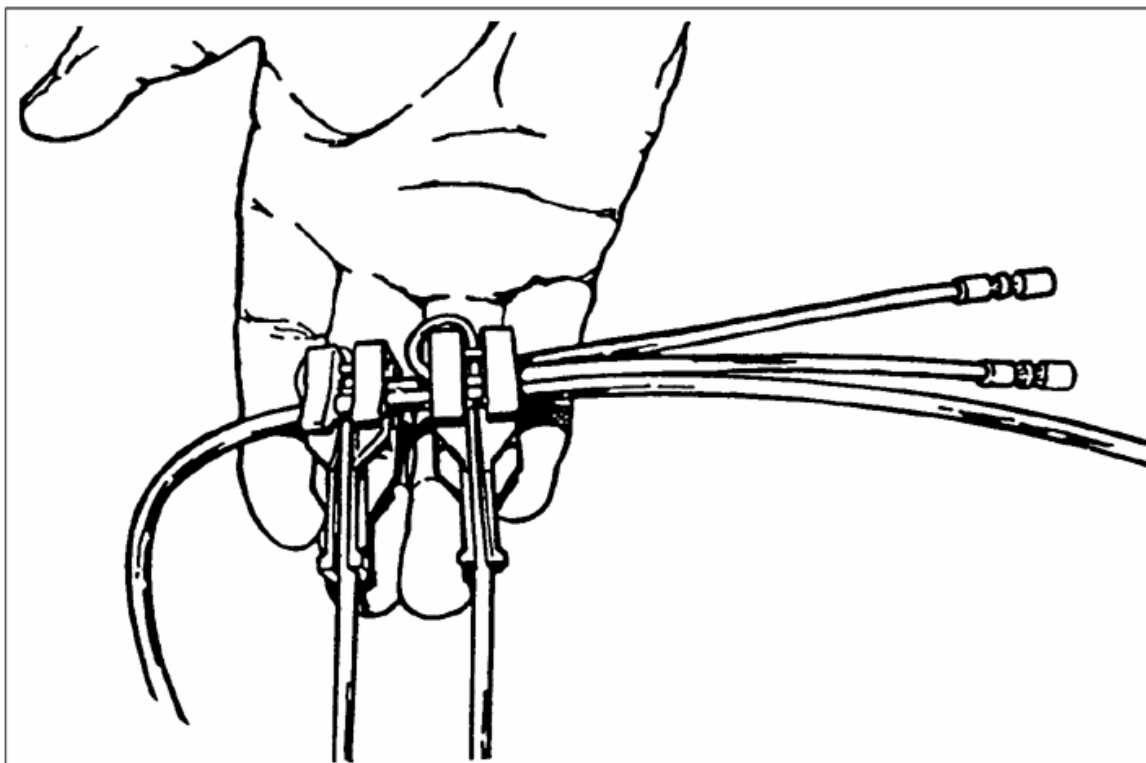


Figure 052-193-1310-10  
J-Hook to the Detonating Cord

- g. Lay out an M11 or M16 transmission line from the end of the detonating-cord line main or ring main to the M12 or M13 transmission-line plastic connector. Ensure that the M11 or M16 blasting caps are underneath a sandbag.
- h. Remove the M12 or M13 plastic connector from underneath the sandbag. Insert the M11 or M16 shock tube to the connector and secure the connection with tape (Figure 052-193-1310-11).

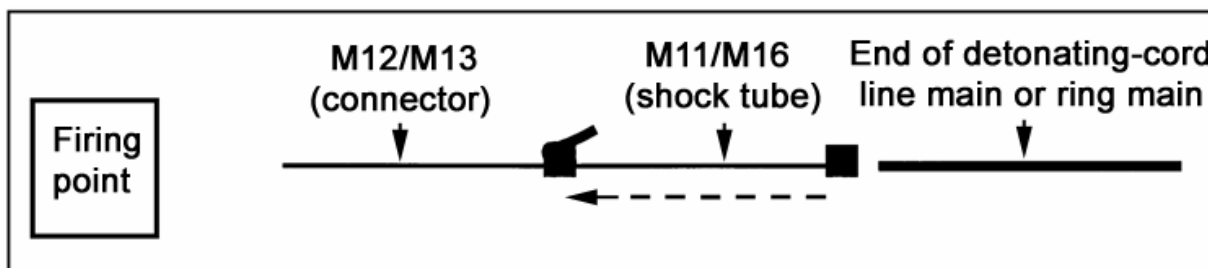


Figure 052-193-1310-11  
M11 to M12/M13

- i. Remove the M11 or M16 blasting cap from underneath the sandbag. Insert the blasting cap into the blasting cap slot of an M9 holder. Close the small hinged flap, loop the end of the detonating-cord line main or ring main into the M9 holder, close the hinged flap, and secure the connection with tape (Figure 052-193-1310-12).



## Performance Steps

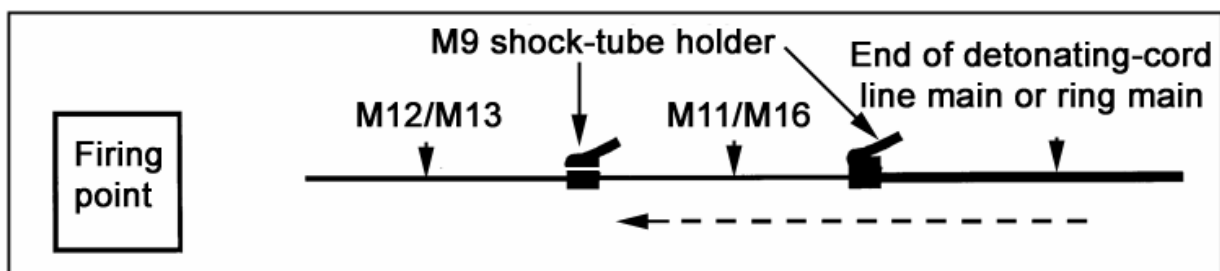


Figure 052-193-1310-12  
Transmission Line to the Detonating Cord

NOTE: Secure all sandbags near the firing point.

- j. Return to the firing point. Construct the initiation set(s) and prepare to initiate the system (Figures 052-193-1310-13 and 052-193-1310-14).

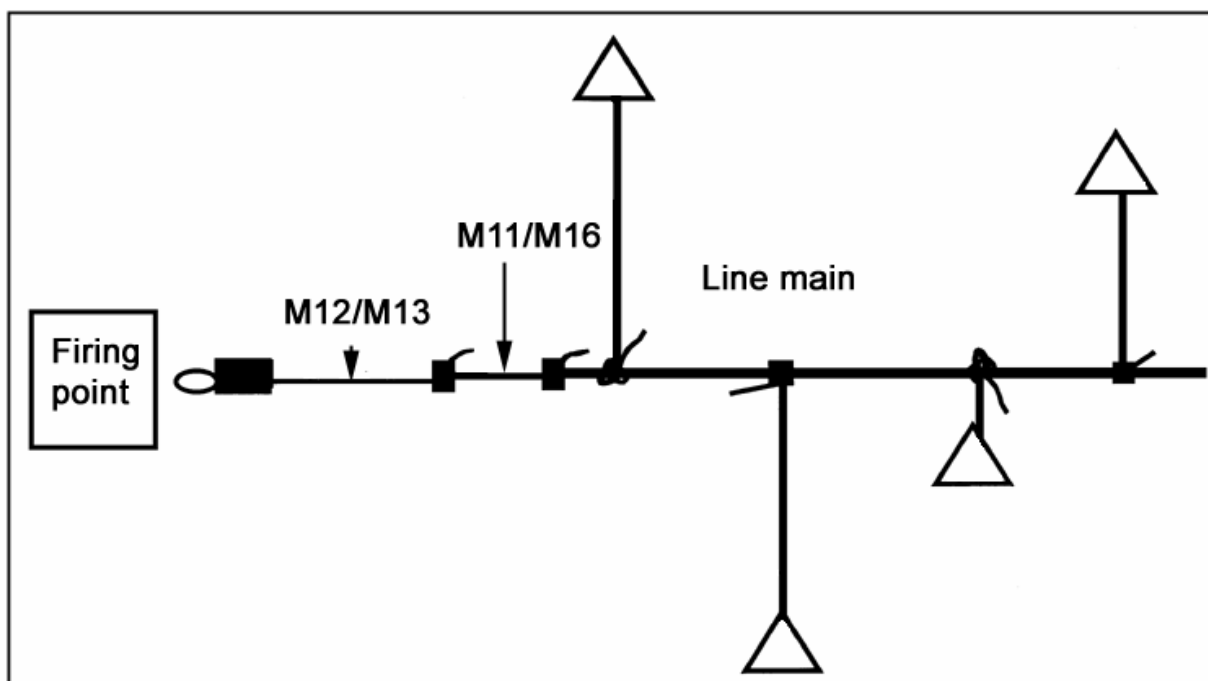


Figure 052-193-1310-13  
Line Main

Performance Steps

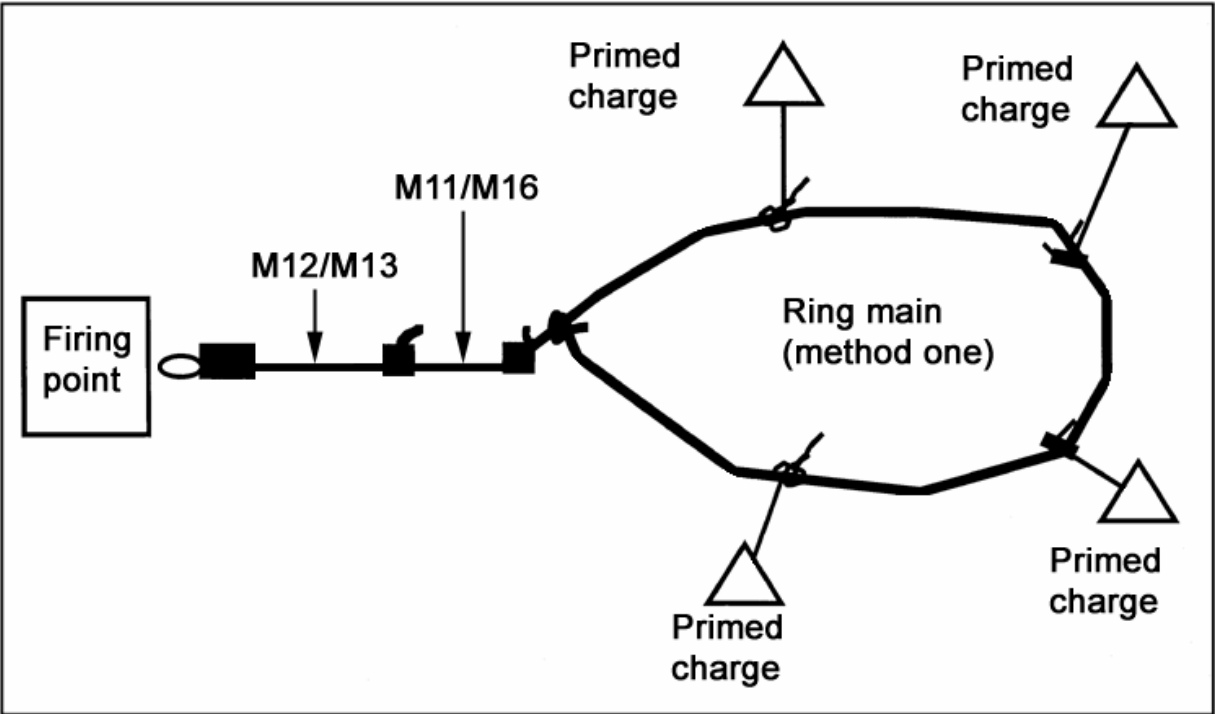


Figure 052-193-1310-14  
Ring Main

NOTE: Charges are primed with detonating cord or MDI. Branch lines are connected with a girth hitch with an extra turn, M1 clip, or J-hook.

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions statement. Ensure that the soldier is evaluated on the construction of the firing system and not on the priming methods or initiating sets. Use inert demolitions for this evaluation.

NOTE: With approval from the site noncommissioned officer in charge (NCOIC), the evaluator may evaluate the soldier on three tasks at one station in sequence: construct demolition firing systems, prime military explosives, and construct demolition initiation sets. Ensure that all conditions and standard statements are read and understood by the evaluated soldier before evaluation.

Brief soldier: Tell the soldier to construct a stand-alone firing system or a combination firing system.

NOTE: Ensure that the soldier understands what he will be evaluated on before the evaluation.

Performance Measures	GO	NO GO
1. Constructed a stand-alone firing system.	—	—
2. Constructed a combination firing system.	—	—

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

References Required	Related FM 5-250
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**Prime Military Explosives**  
**052-193-1311**

**Conditions:** As a combat engineer squad member in a field environment, given various types of military explosives, detonating cord, modernized demolition initiators (MDIs) with high-strength blasting caps, a demolition knife, M2 crimpers, string, and adhesive tape.

**Standards:** Prime the explosives, in sequence, without causing premature detonation.

**Performance Steps**

1. Prime military explosives with detonating cord. Use the methods below to prime trinitrotoluene (TNT) blocks with detonating cord.
  - a. Common method. Lay one end (1-foot length) of detonating cord at an angle across the explosive. Wrap the running end around the block three turns, laying the wraps over the standing end. On the fourth wrap, slip the running end under all of the wraps, parallel to the standing end, and draw the wraps tight. This forms a clove hitch with two extra turns (Figure 052-193-1311-1).

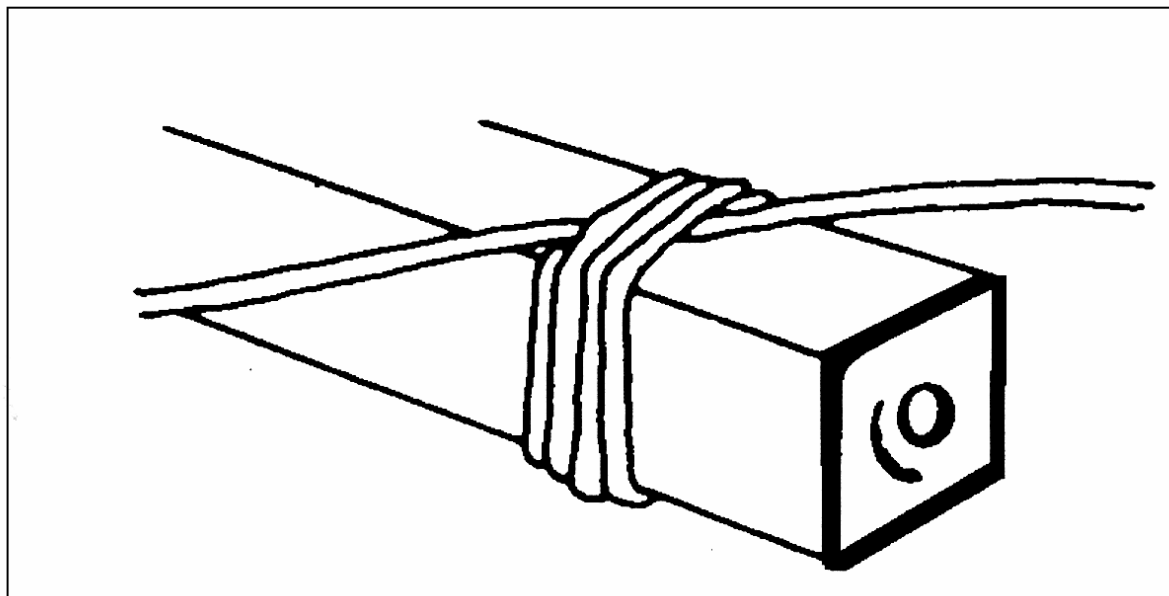


Figure 052-193-1311-1  
Common Method

- b. Alternate method. Place a loop of detonating cord on the explosive. Leave enough length on the end to make four turns around the block and loop with the remaining end of the detonating cord. Ensure that the first wrap crosses over the standing end of the loop. Work toward the closed end of the loop, passing the free end of the detonating cord through the loop. Pull the running end through the eye of the loop and tighten it (Figure 052-193-1311-2).

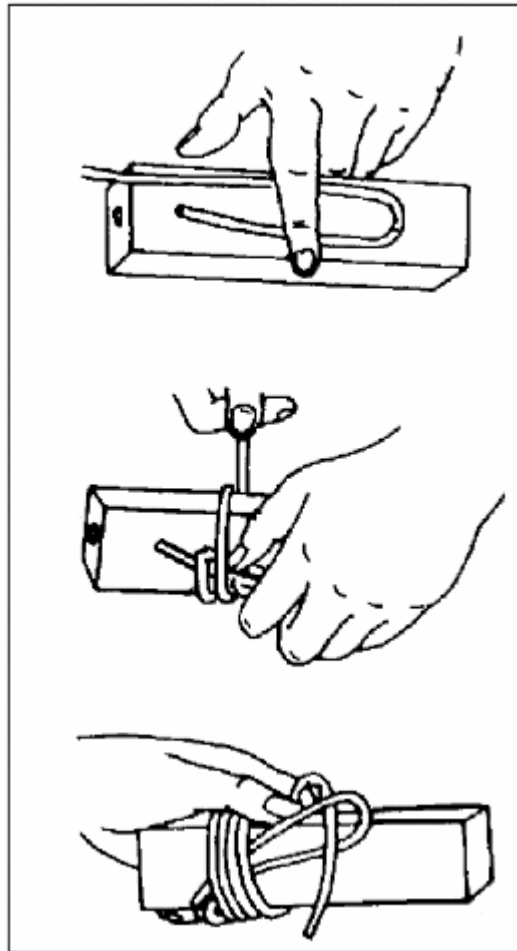
**Performance Steps**

Figure 052-193-1311-2  
Alternate Method

2. Prime M112 (composition C4 [C4]) demolition blocks with detonating cord.
  - a. Form either a uli, a double overhand, or a triple roll knot (Figure 052-193-1311-3).

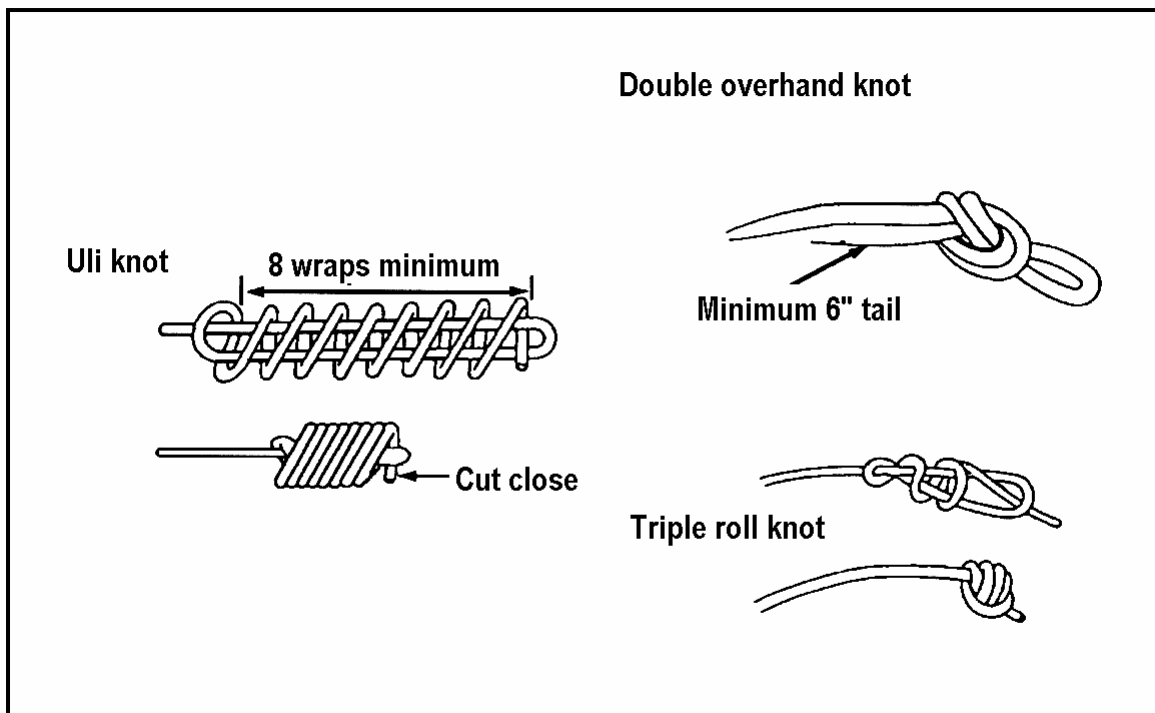
**Performance Steps**

Figure 052-193-1311-3  
Detonating Cord Knots

- b. Cut an L-shaped portion of explosives, but leave it connected to the explosive. Ensure that the space is large enough to insert the knot you formed (Figure 052-193-1311-4).

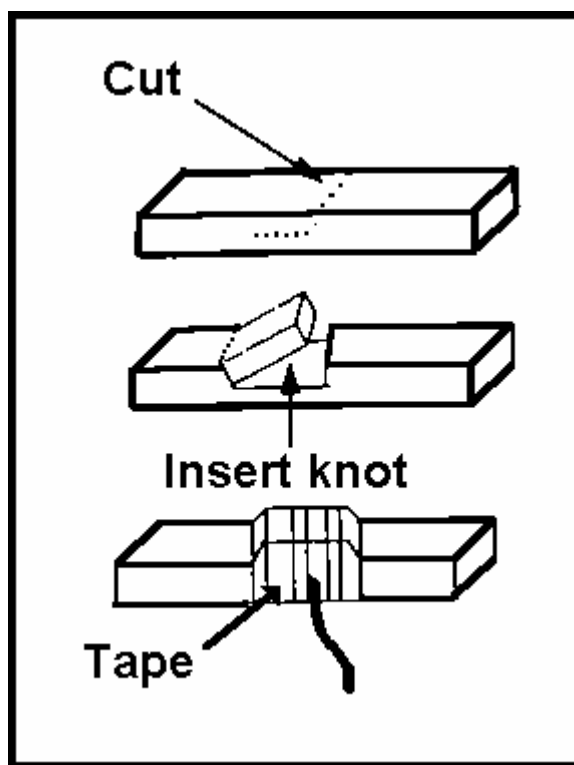
**Performance Steps**

Figure 052-193-1311-4  
C4, L-Shaped Cut

**CAUTION:** USE A SHARP, NONSPARKING KNIFE ON A NONSPARKING SURFACE TO CUT THE EXPLOSIVES.

- c. Insert the knot into the L-shaped cut, and push the explosive over the knot. Ensure that there is at least one-half inch of explosive on all sides of the knot. Strengthen the primed area by wrapping it with tape.
3. Prime M118 and M186 demolition charges (sheet charges) with detonating cord (Figure 052-193-1311-5).

## Performance Steps

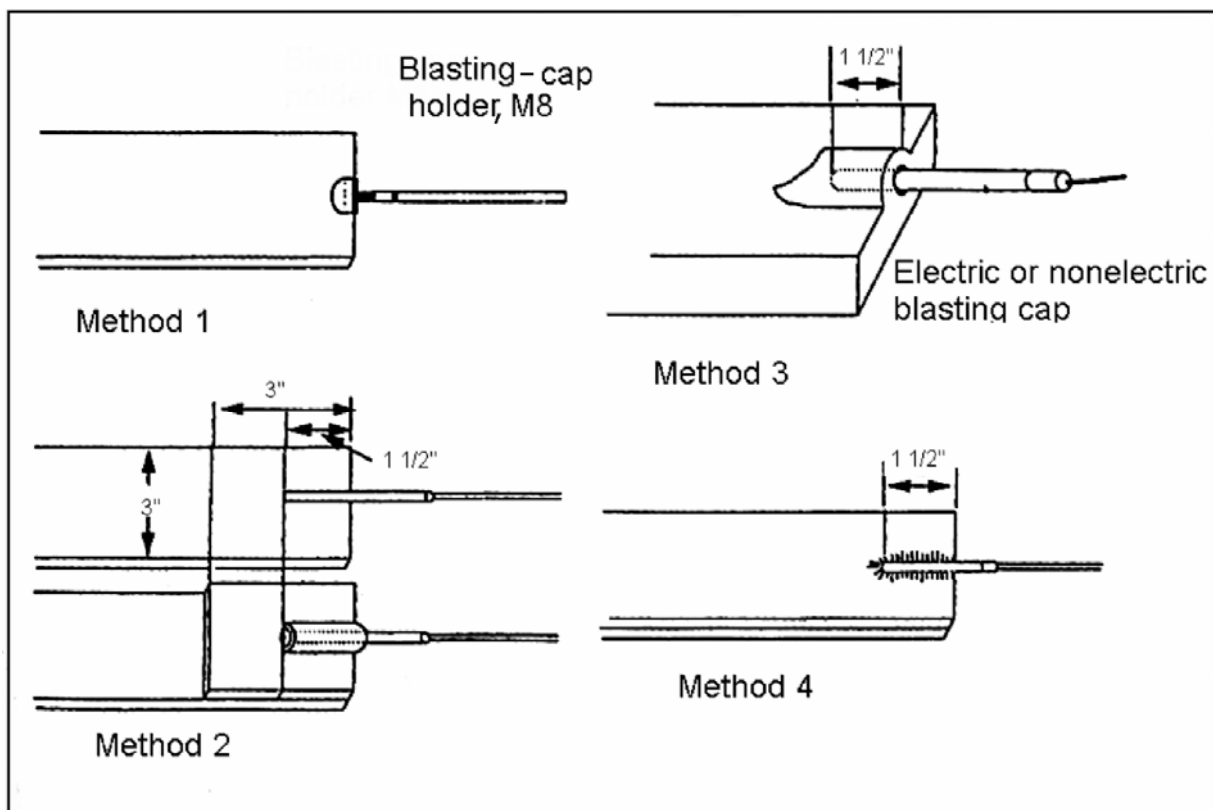


Figure 052-193-1311-5  
Demolition Charges

- a. Form a uli, double overhand, or triple roll knot.
  - b. Insert the knot between two sheets of explosive, or place the knot on top of the sheet explosive. Secure it with a small strip of sheet explosive. The knot must be covered on all sides with at least one-half inch of explosive.
4. Prime dynamite with detonating cord.
    - a. Use the M2 crimpers and, starting one inch from either end of the dynamite charge, punch four equally spaced holes through the dynamite cartridge (Figure 052-193-1311-6).
- NOTE: Rotate the cartridge 180 degrees after punching each hole to keep the holes parallel.
- b. Lace the detonating cord through the holes in the same direction the holes were punched (Figure 052-193-1311-6).
- CAUTION: DO NOT PULL THE DETONATING CORD TOO TIGHT. THE CARTRIDGE WILL BREAK.
- c. Secure the detonating-cord tail by passing it between the detonating-cord lace and the dynamite charge (Figure 052-193-1311-6).

## Performance Steps

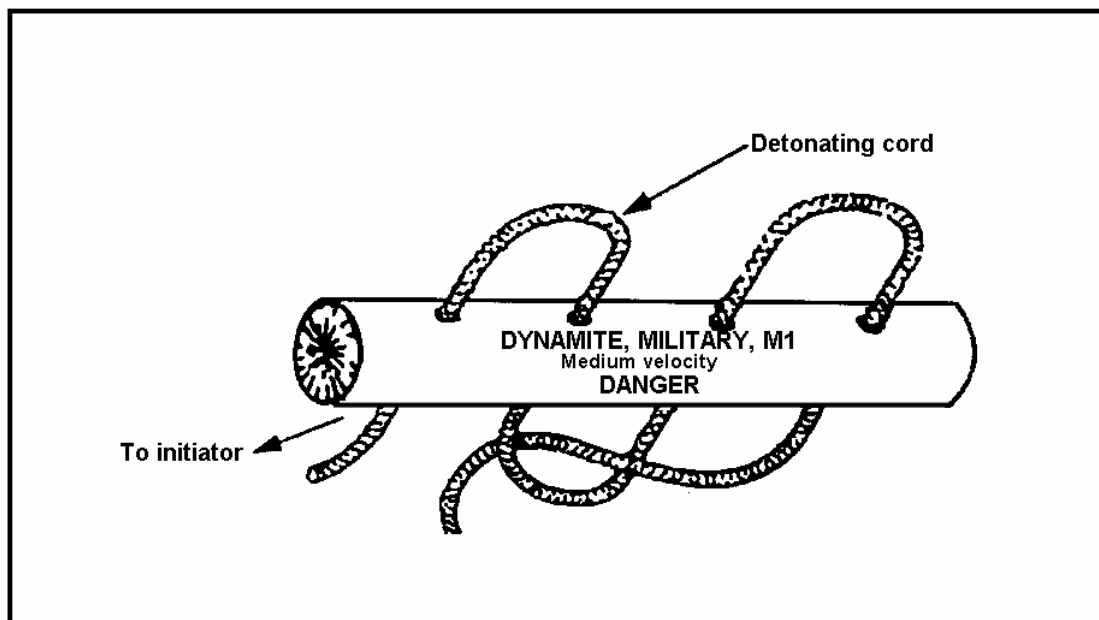


Figure 052-193-1311-6  
Priming Dynamite

5. Prime a 40-pound cratering charge (Figure 052-193-1311-7).

NOTE: Because the cratering charge is primarily an underground charge, prime it only with C4 primed with a detonating cord. Dual prime to protect against misfires.

a. Prime a 40-pound, composition H6 (H6) cratering charge.

- (1) Prime two packages of C4 with detonating cord.
- (2) Place the primed packages parallel to the cratering charge, on opposite sides of it, and flush with the top.
- (3) Firmly hold the packages in place with 100-miles-per-hour tape.



## Performance Steps

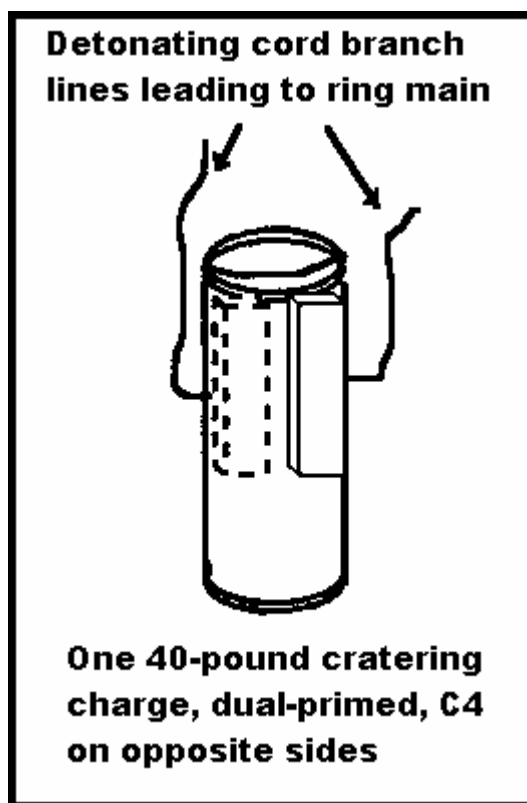


Figure 052-193-1311-7  
H6 Cratering Charge

NOTE: Instructions and markings on the canister indicate the exact placement of the primed C4.

NOTE: Ensure that the detonating-cord branch lines (from the C4) are long enough to reach the detonating-cord line main or ring main.

NOTE: Place tape on the detonating cord from the cratering charge one foot up to aid in clearing possible misfires.

b. Prime a 40-pound ammonium nitrate cratering charge.

CAUTION: AMMONIUM NITRATE IS HYGROSCOPIC AND INEFFECTIVE WHEN WET; THEREFORE, INSPECT THE METAL CONTAINER FOR DAMAGE OR RUST. DO NOT USE DAMAGED OR RUSTY CHARGES.

- (1) Pass the end of the detonating cord through the tunnel on the side of the cratering charge.
- (2) Tie an overhand knot with a 6-inch tail at the lower end of the length of the detonating cord.
- (3) Take a preprimed 1-pound block of explosive (C4 or TNT) and tape the charge along the center of the cratering charge (Figure 052-193-1311-8).

## Performance Steps

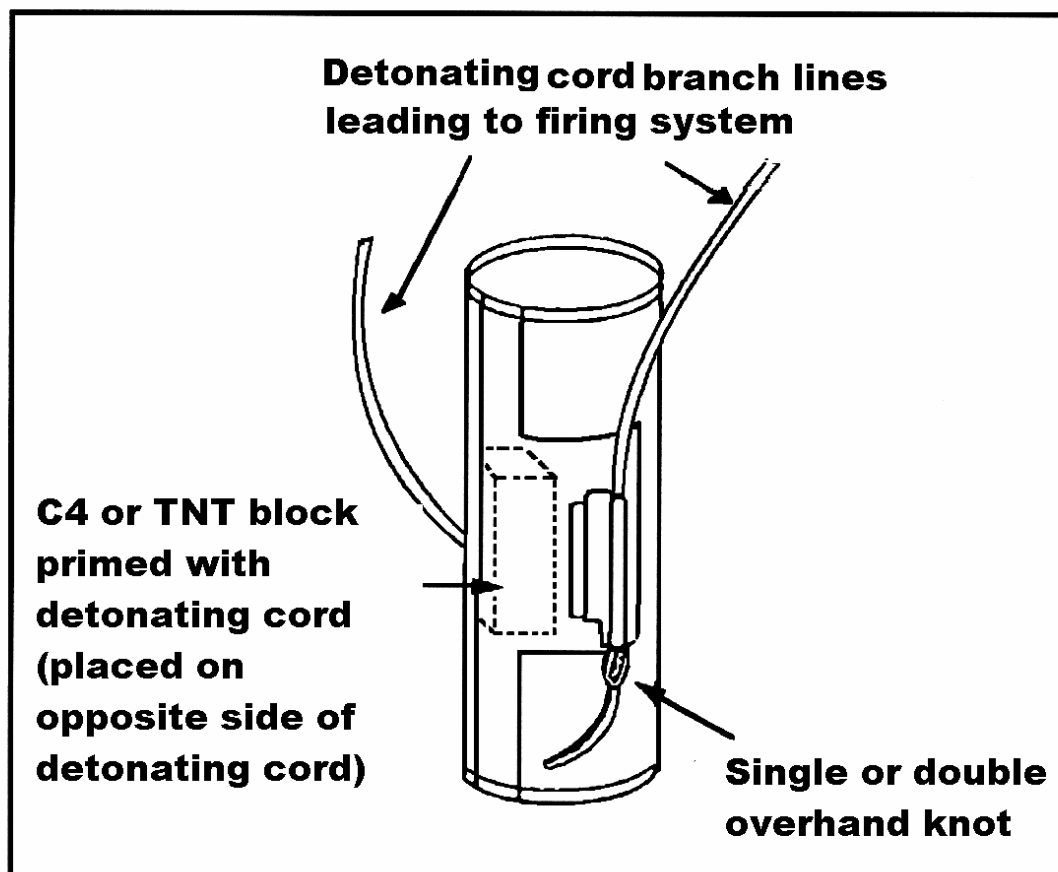


Figure 052-193-1311-8  
Prime Cratering Charge

6. Prime a bangalore torpedo with detonating cord.

**CAUTION:** USE EXACTLY EIGHT WRAPS TO PRIME THE TORPEDO. TOO MANY WRAPS WILL EXTEND THE DETONATING CORD PAST THE BOOSTER CHARGE HOUSING, POSSIBLY CAUSING THE TORPEDO TO BE CUT WITHOUT DETONATION. TOO FEW WRAPS MAY CAUSE THE TORPEDO TO ONLY BE CREASED WITHOUT DETONATION.

- a. Wrap the detonating cord eight times around the end of the section, just below the bevel, and pull the knot tight (Figure 052-193-1311-9).
- b. After pulling the knot tight, insert the short end of the detonating cord into the cap well, and secure it with tape when needed.

## Performance Steps

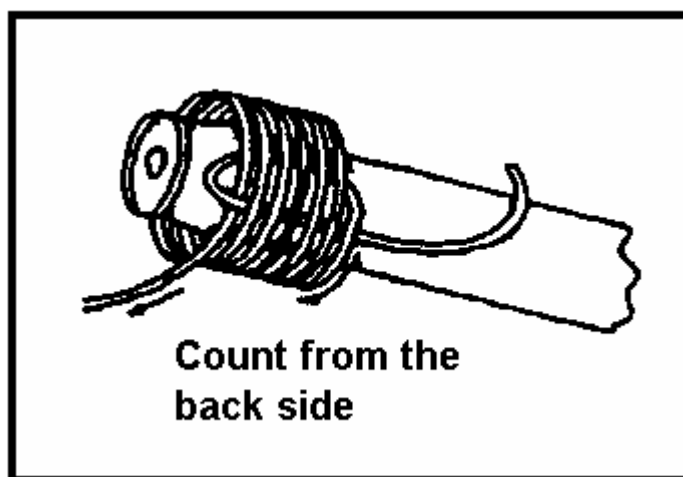


Figure 052-193-1311-9  
Bangalore Torpedo

**WARNING:** NEVER USE THE SHORT END (TAIL) OF THE DETONATING CORD TO INITIATE THE TORPEDO. INITIATION MUST COME FROM THE RUNNING END OF THE DETONATING CORD CONNECTED TO THE LINE MAIN OR RING MAIN.

7. Prime TNT with an MDI high-strength blasting cap and an M1A4 priming adapter.
  - a. Place the blasting cap underneath a sandbag.
  - b. Use the pointed end of the M2 crimpers to punch a hole in the paper covering the cap well of the block of TNT.
  - c. Inspect the cap well to ensure that nothing is preventing the blasting cap from fully seating in the cap well of the explosive.
  - d. Attach the priming adapter.

**NOTE:** The M1A4 priming adapter must be slid down the full length of the shock tube to the blasting cap.

- (1) Cut the desired amount of shock tube, or cut the sealed end of the shock tube, and remove the J hook (when attached).
- (2) Slide the priming adapter onto the shock tube, threaded end first, down to the blasting cap.
- (3) Remove the blasting cap from underneath the sandbag, slide the priming adapter over the blasting cap, and place the blasting cap back underneath the sandbag.
- (4) Replace the J hook, when used.
- e. Secure the blasting cap to the TNT block.
  - (1) Remove the blasting cap from underneath the sandbag.
  - (2) Secure the blasting cap in one hand. Ensure that the cap is completely enclosed in the hand and facing down and away from the thumb (Figure 052-193-1311-10).

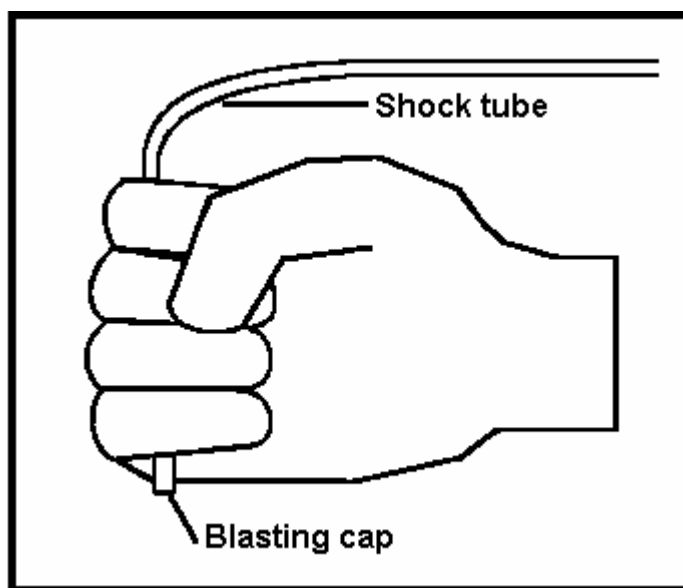
**Performance Steps**

Figure 052-193-1311-10  
Holding the Blasting Cap

- (3) Insert the blasting-cap end into the threaded cap well of the TNT (Figure 052-193-1311-11).

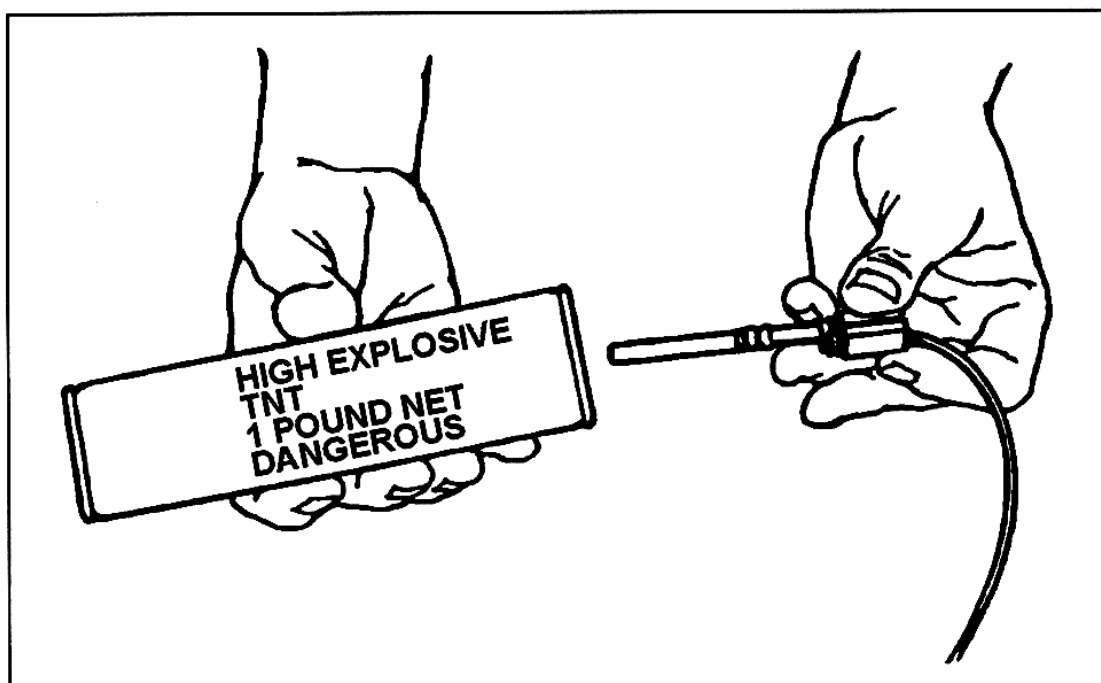


Figure 052-193-1311-11  
Inserting Blasting Cap in TNT

- (4) Tighten the priming adapter by screwing it into the threaded cap well.

**Performance Steps**

8. Prime TNT with an MDI high-strength blasting cap using the string or tape method.
  - a. String Method.
    - (1) Place the blasting cap underneath a sandbag.
    - (2) Use the pointed end of the M2 crimpers to punch a hole in the paper that covers the threaded cap well of the block of TNT.
    - (3) Inspect the threaded cap well to ensure that nothing is preventing the blasting cap from fully seating in the threaded cap well of the explosive.
    - (4) Wrap the string around the block four times. Ensure that the tails are the same length, and secure the wraps with a nonslip knot (Figure 052-193-1311-12).

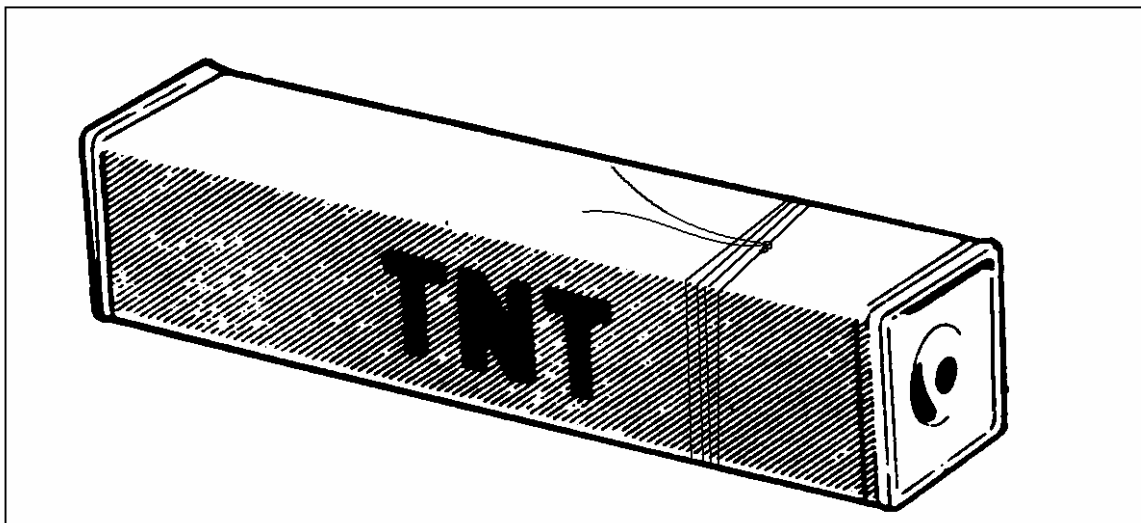


Figure 052-193-1311-12  
Tie String Around TNT

- (5) Remove the blasting cap from underneath the sandbag.
    - (6) Secure the blasting cap in one hand. Ensure that the cap is completely enclosed in the hand, facing down, and away from the thumb.
    - (7) Insert the blasting cap end into the threaded cap well of the TNT.
    - (8) Bend the shock tube over the nonslip knot, and secure it with two half-hitches (Figure 052-193-1311-13).

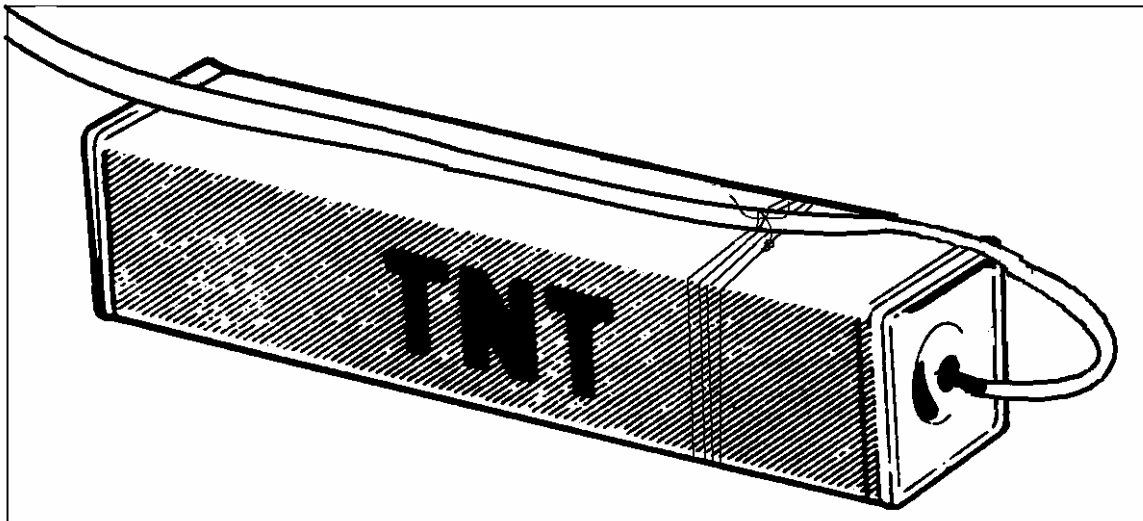
**Performance Steps**

Figure 052-193-1311-13  
Secure Shock Tube With String

**b. Tape Method:**

- (1) Place the blasting cap underneath a sandbag.
- (2) Use the pointed end of the M2 crimpers to punch a hole in the paper that covers the threaded cap well of the block of TNT.
- (3) Inspect the threaded cap well to ensure that nothing is preventing the blasting cap from fully seating in the threaded cap well of the explosive.
- (4) Remove the blasting cap from underneath the sandbag.
- (5) Secure the blasting cap in one hand. Ensure that the cap is completely enclosed in the hand, facing down, and away from the thumb.
- (6) Insert the blasting cap end into the threaded cap well of the TNT.
- (7) Bend the shock tube over the block, and secure it with electrical tape (Figure 052-193-1311-14).

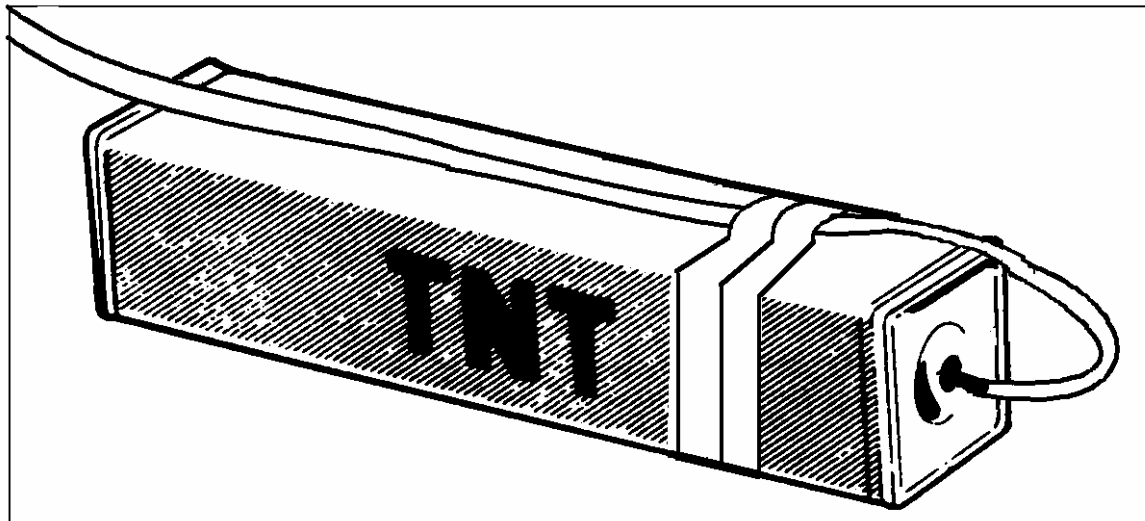
**Performance Steps**

Figure 052-193-1311-14  
Secure Shock Tube With Tape

9. Prime dynamite with an MDI high-strength blasting cap.
  - a. End Priming Method.
    - (1) Place the blasting cap underneath a sandbag.
    - (2) Use the M2 crimpers or another nonsparking tool to make a cap well in one end of the dynamite cartridge.
    - (3) Remove the blasting cap from underneath the sandbag, and insert the blasting cap into the cap well.
    - (4) Secure the blasting cap and shock tube to the cartridge with tape to hold the blasting cap firmly in place (Figure 052-193-1311-15).

## Performance Steps

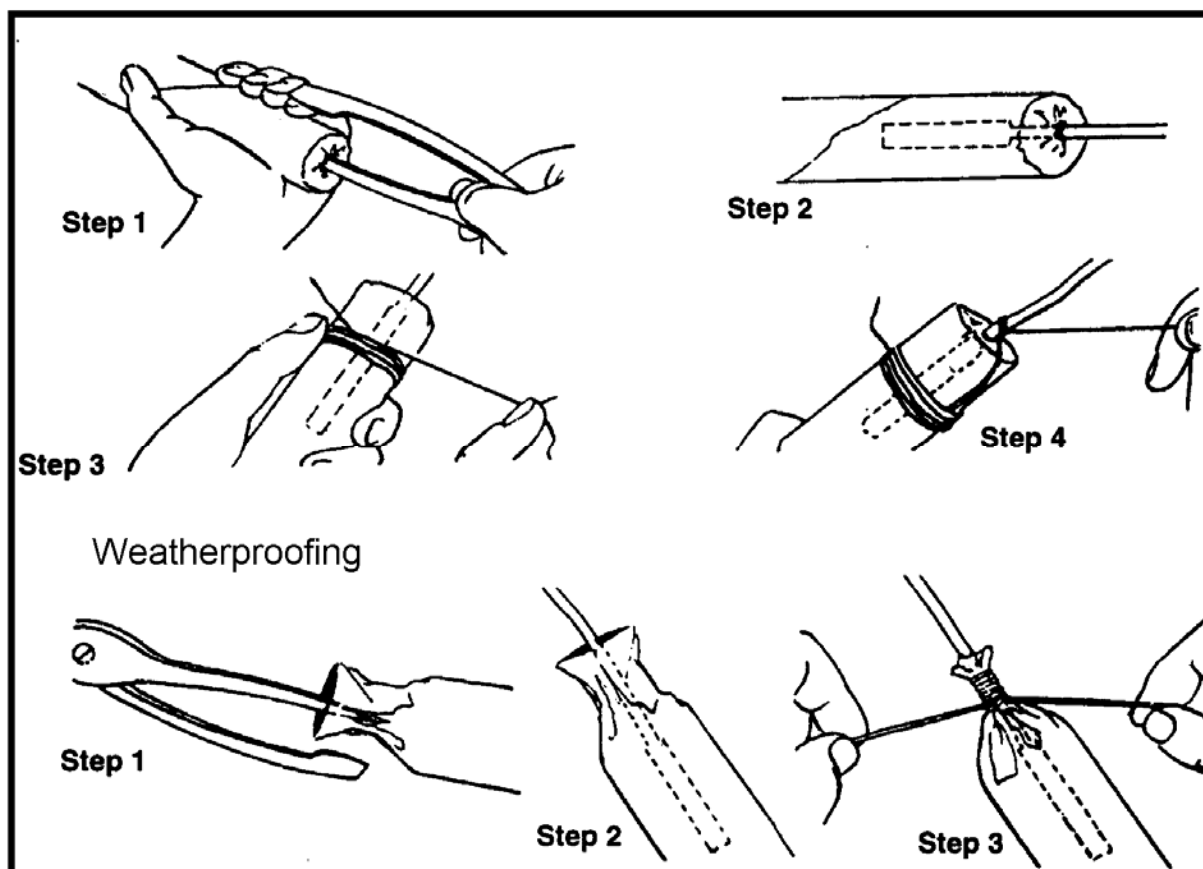


Figure 052-193-1311-15  
End-Priming Method

b. Side-Priming Method.

- (1) Place the blasting cap underneath a sandbag.
- (2) Use the M2 crimpers to make a cap well (about 1 1/2 inches long) in the side of the dynamite cartridge at one end. Slightly slant the cap well so the blasting cap, when inserted, will be nearly parallel to the side of the cartridge and the explosive end of the cap will be at a point nearest the middle of the cartridge.
- (3) Insert the blasting cap into the cap well.
- (4) Tie a string securely around the fuse. Then, wrap the string tightly around the cartridge, making two or three turns before tying it (Figure 052-193-1311-16).



## Performance Steps

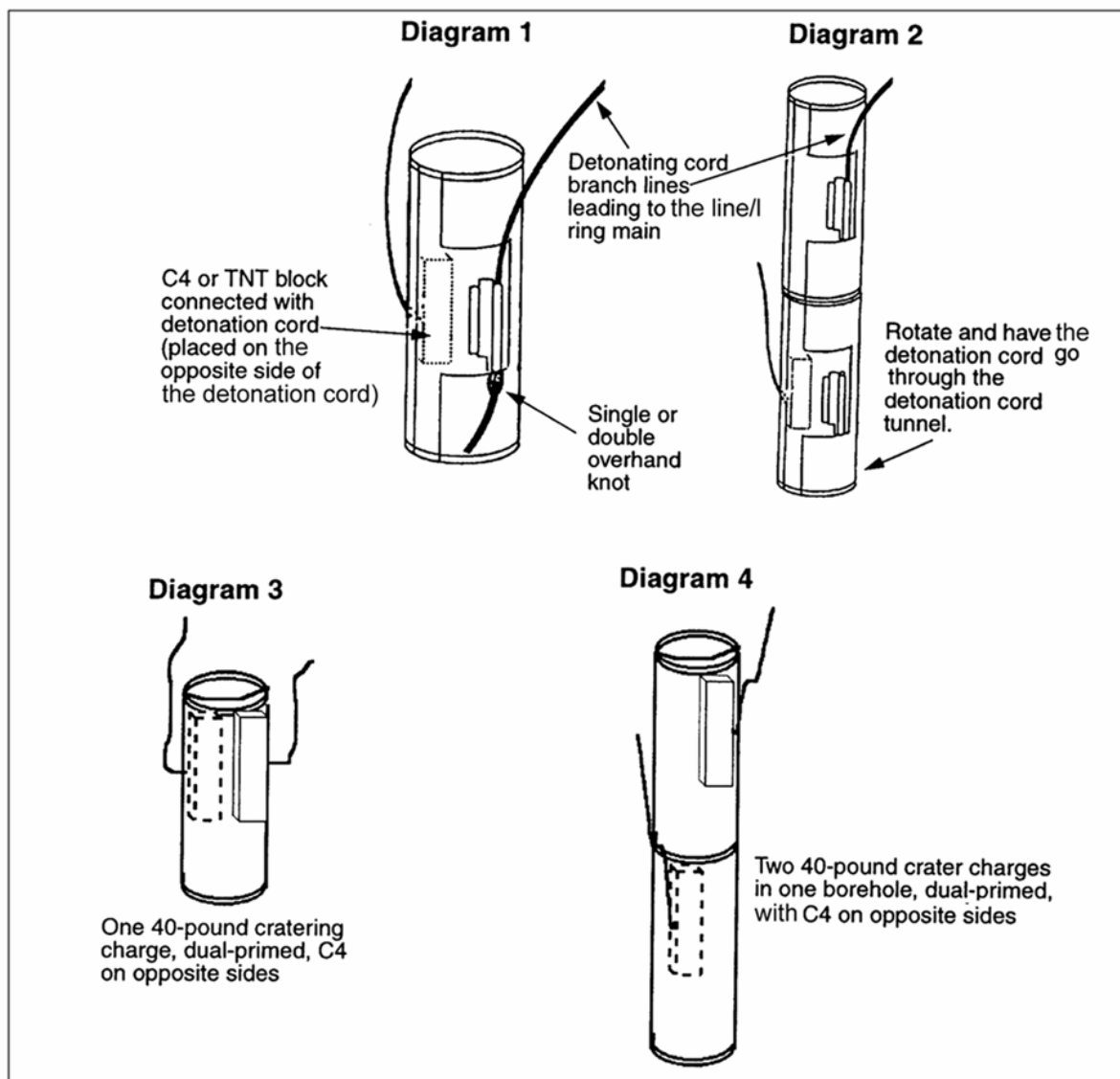


Figure 052-193-1311-16  
Side-Priming Method

NOTE: Weatherproof the primed cartridge by wrapping a string snugly around the cartridge, extending it an inch or so on each side of the hole to cover the hole completely. Cover the string with a weatherproof sealing compound.

10. Prime the M112 demolition block (C4) with an MDI high-strength blasting cap.
  - a. Place the blasting cap underneath a sandbag.
  - b. Use the M2 crimpers or another nonsparking tool to make a hole in one end or in the side (at midpoint) of the demolition block.

NOTE: The hole must be large enough to hold a blasting cap.

- c. Remove the blasting cap from underneath the sandbag, and insert the blasting cap into the hole of the demolition block (Figure 052-193-1311-17).

## Performance Steps

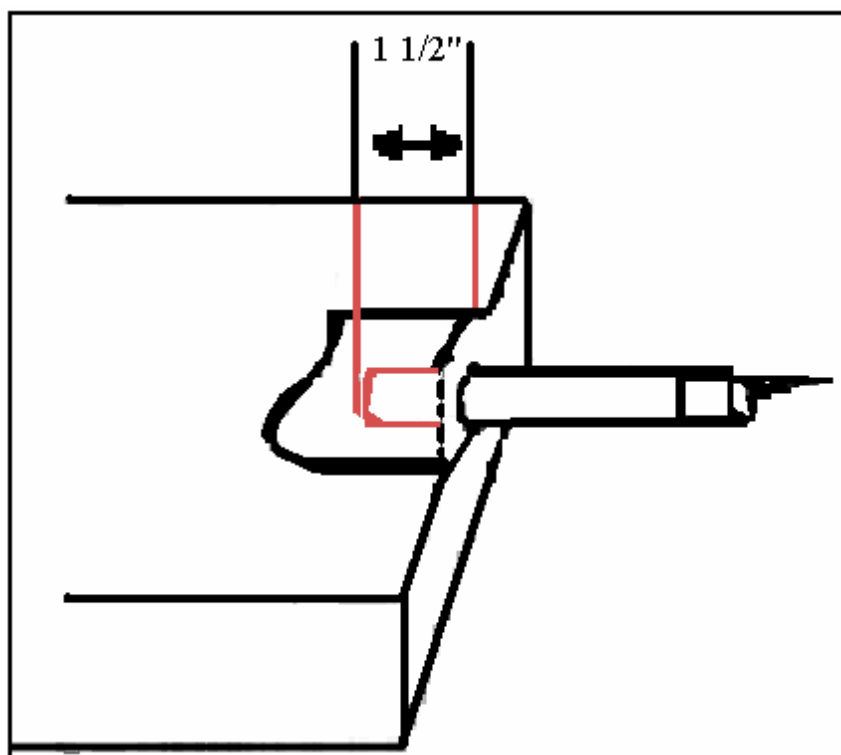


Figure 052-1893-1311-17  
Prime C4 with MDI High Strength Cap

**WARNING: DO NOT FORCE THE BLASTING CAP. IF THE BLASTING CAP DOES NOT FIT, ENLARGE THE HOLE.**

- d. Anchor the blasting cap into the block by gently squeezing the C4 plastic explosive around the cap.
- e. Use electrical tape to secure the cap in the charge.

11. Prime an M2A4 or M3A1 shape charge with an MDI high-strength blasting cap and an M1A4 priming adapter.

**NOTE 1:** Do not prime the charge until it is placed on the target.

**NOTE 2:** Use tape to secure the blasting cap in the threaded cap well when a priming adapter is not used.

- a. Place the blasting cap underneath a sandbag.
- b. Position the charge.
- c. Cut the desired amount of shock tube, or cut the sealed end of the shock tube and remove the J hook, when attached.
- d. Slide the priming adapter onto the shock tube, threaded end first, down to the blasting cap.
- e. Remove the blasting cap from underneath the sandbag, slide the priming adapter over the blasting cap, and place the blasting cap back underneath the sandbag.
- f. Replace the J hook, if used.
- g. Remove the blasting cap from underneath the sandbag.
- h. Secure the blasting cap in one hand. Ensure that the cap is completely enclosed in the hand, facing down, and away from the thumb.
- i. Insert the blasting cap into the threaded cap well of the shape charge. Secure the blasting cap by tightening the priming adapter into the threaded cap well (Figure 052-193-1311-18).

Performance Steps

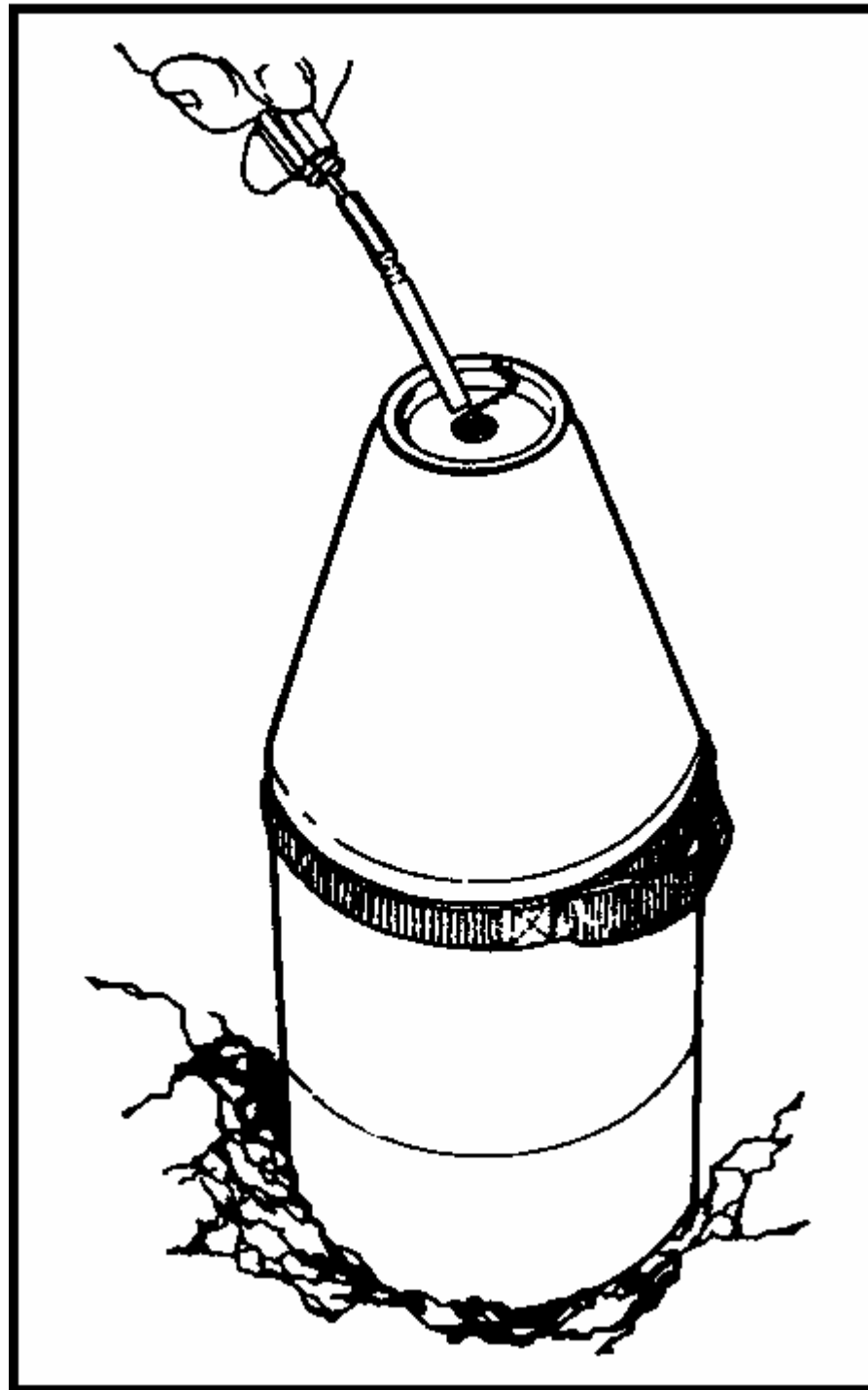


Figure 052-193-1311-18  
Priming the Shaped Charger With MDI

12. Prime the bangalore torpedo with an MDI high-strength blasting cap and a M1A4 priming adapter.

**Performance Steps**

NOTE: Do not prime the charge until it is placed on the target.

NOTE: Secure the blasting cap in the threaded cap well by using tape when a priming adapter is not used.

- a. Place the blasting cap underneath a sandbag.
- b. Position the charge.
- c. Cut the desired amount of shock tube, or cut the sealed end of the shock tube, and remove the J hook, when attached.
- d. Slide the priming adapter onto the shock tube, threaded end first, down to the blasting cap.
- e. Remove the blasting cap from underneath the sandbag. Slide the priming adapter over the blasting cap, and place the blasting cap back underneath the sandbag.
- f. Replace the J hook, when used.
- g. Remove the blasting cap from underneath the sandbag.
- h. Secure the blasting cap in one hand. Ensure that the cap is completely enclosed in the hand, facing down, and away from the thumb.
- i. Insert the blasting cap into the threaded cap well of the bangalore torpedo. Secure the blasting cap by tightening the priming adapter into the threaded cap well (Figure 052-193-1311-19).

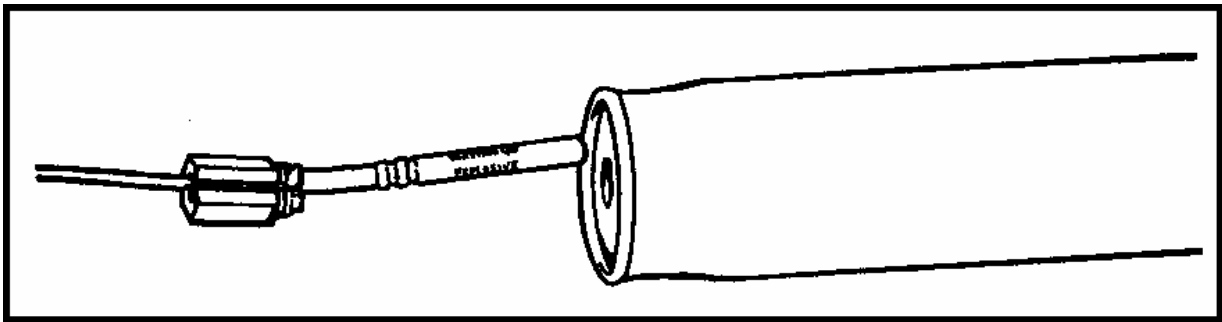


Figure 052-193-1311-19  
Priming Bangalore With MDI

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions statement. Ensure that the soldier has various types of military explosives to be primed, using detonating cord and an MDI. Use the inert demolition equipment for this task.

Brief soldier: Tell the soldier he will be priming several different types of military explosives using detonating cord and MDI.

**Performance Measures**

1. Primed military explosives with detonating cord.
2. Primed military explosives with MDI.

**GO**      **NO GO**

\_\_\_\_      \_\_\_\_  
\_\_\_\_      \_\_\_\_

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

**References**

**Required**

**Related**

FM 5-250  
TM 9-1375-213-12

## Construct Demolition Initiating Sets

### 052-193-1312

**Conditions:** As a combat engineer squad member in a field environment, given a demolition firing system, an M11 or an M16 branch line, an M12 or an M13 transmission line, an M14 time-delay fuse, an M81 fuse igniter, an M9 holder, adhesive tape, a demolition knife, and a sandbag.

**Standards:** Construct command and delay demolition initiating sets without causing premature detonation.

#### Performance Steps

NOTE 1: All modernized demolition initiator (MDI) blasting caps can be used to initiate a shock tube. Only use the M11, M14, and M15 high-strength blasting caps to detonate the detonation cord line main or ring main.

NOTE 2: Use MDI initiating sets to initiate instantly by using M12 and M13 transmission lines or an M14 delay fuse for delay initiation up to 5 minutes.

NOTE 3: When using combination command and delay demolition initiating sets on demolition firing systems, the command initiation set will be the primary set and the delay initiation set will be the secondary set. Place a sandbag on the secondary initiation set blasting cap to reduce fragmentation hazard of the cap when detonated from the firing system.

1. Construct a command initiation set.
  - a. Lay out one or more M12s or M13s to achieve the necessary safe distance from the explosive charges being emplaced, and place the plastic connectors under a sandbag.
  - b. Connect the blasting cap furthest from the initiation point to the demolition firing system.
    - (1) MDI demolition firing system. Remove the plastic connector from underneath the sandbag. Open the large-hinged flap on the plastic connector of the M12 or M13 transmission line, and loop the end of the firing system shock tube into a 6-inch bite around the plastic connector. Insert the shock tube into the channels of the plastic connector. Snap the large-hinged flap shut and secure it with tape (Figure 052-193-1312-1).

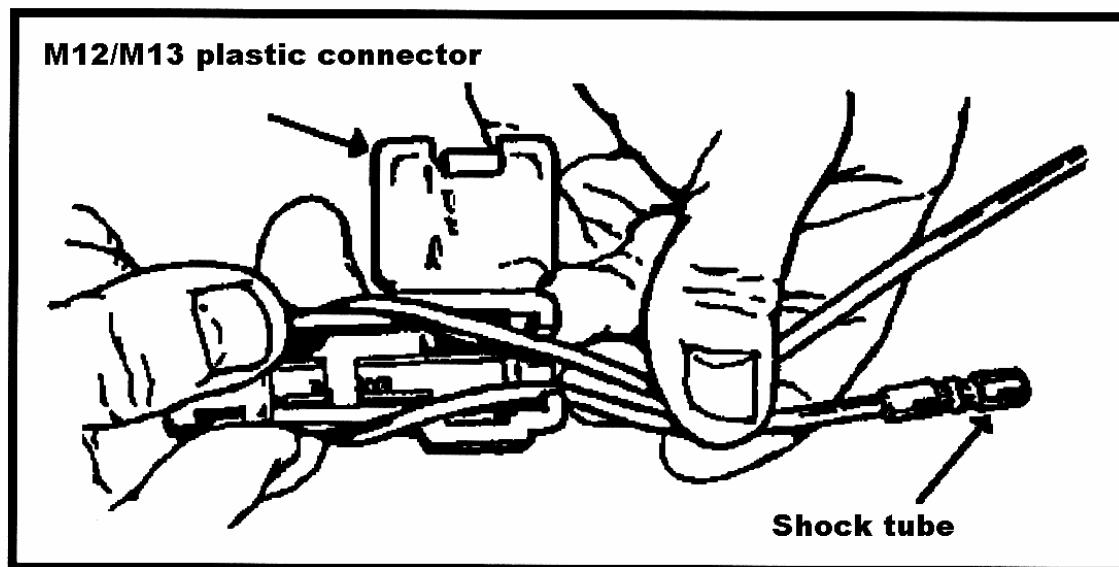
**Performance Steps**

Figure 052-193-1312-1  
Connecting the Shock Tube to the M12/M13

NOTE 1: Continue this procedure with the M12s and M13s to the initiation point or until the necessary safe distance from the explosives is achieved.

NOTE 2: Ensure that the shock tube is in contact with the blasting cap.

NOTE 3: Do not insert more than five shock tubes into the plastic connector.

(2) Detonation cord demolition firing system.

- (a) Lay out one or more M12s or M13s to achieve the necessary safe distance from the explosive charges being emplaced, and place the plastic connectors under a sandbag. Connect an M11 high-strength blasting cap to the detonating-cord ring main or line main (Figure 052-193-1312-2).

## Performance Steps

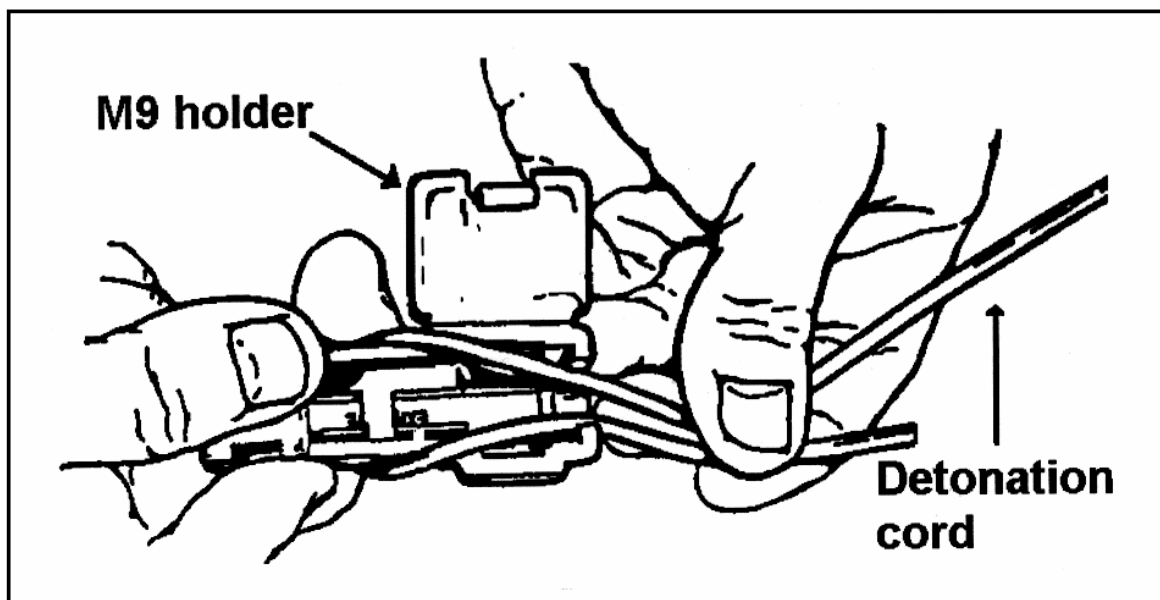


Figure 052-193-1312-2  
Connect Detonation Cord to the M9 Holder

- (b) Connect the blasting cap furthest from the initiation point to the demolition firing system.
- (c) Open both hinged flaps on the M9 holder, insert the M11 blasting cap into the cap slot, and snap the flap shut. Loop the detonating-cord firing system ring main or line main into a 6-inch bite around the M9 holder and insert the detonation cord into the channels of the holder. Snap the hinged flap shut and secure it with tape.

NOTE: Ensure that the detonating cord is in contact with the blasting cap.

- (d) Remove the plastic connector from underneath the sandbag. Open the large hinged flap on the plastic connector of the M12 or M13 transmission line and loop the end of the M11 shock tube into a 6-inch bite around the plastic connector. Insert the shock tube into the channels of the plastic connector. Snap the large hinged flap shut and secure it with tape (refer to Figure 052-193-1312-1).

NOTE 1: Ensure that the shock tube is in contact with the blasting cap.

NOTE 2: Continue this procedure with the M12s and M13s to the initiation point or until the necessary safe distance from the explosives is achieved.

- c. Connect the M81 fuse igniter to the shock tube.

- (1) Turn the M81 end cap one-half turn counterclockwise, and pull the shipping plug out of the igniter (Figure 052-193-1312-3).

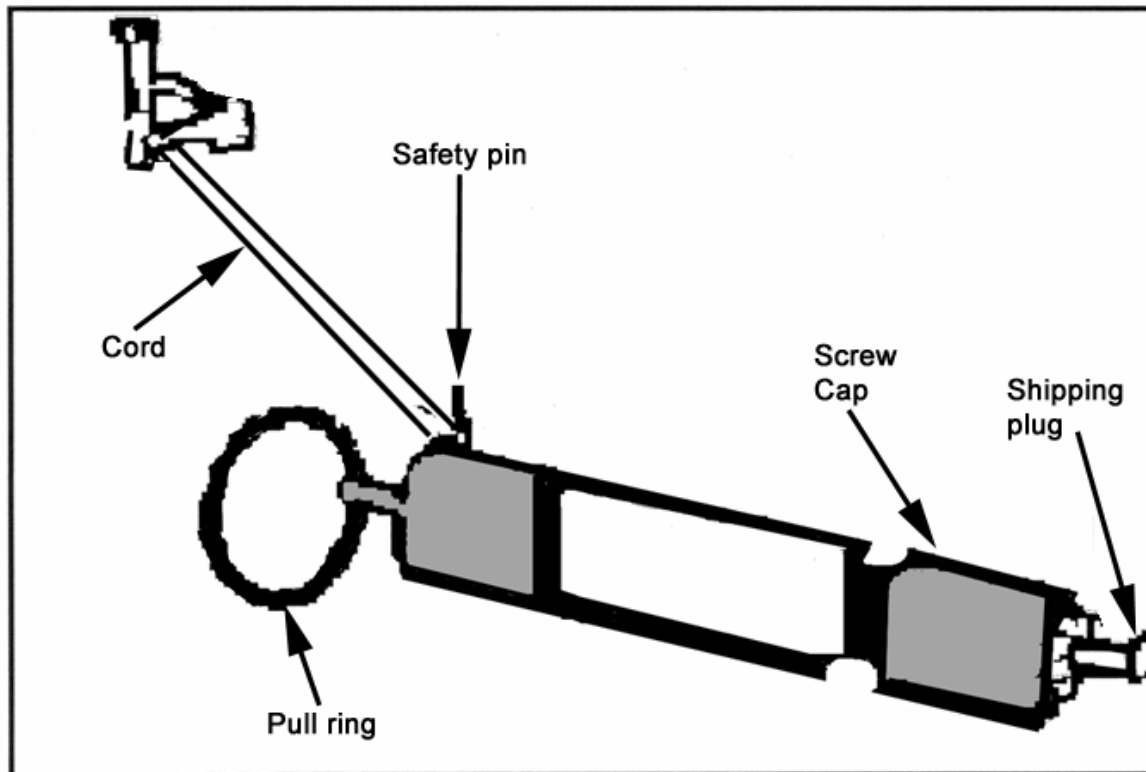
**Performance Steps**

Figure 052-193-1312-3  
M81 Fuse Igniter

- (2) Cut off the crimped, sealed end of the shock tube.

NOTE: Use the demolition knife to cut the shock tube for a smooth cut. M2 crimpers do not ensure a smooth cut.

- (3) Push the shock tube into the M81's end cap as far as it will go (Figure 052-193-1312-4).

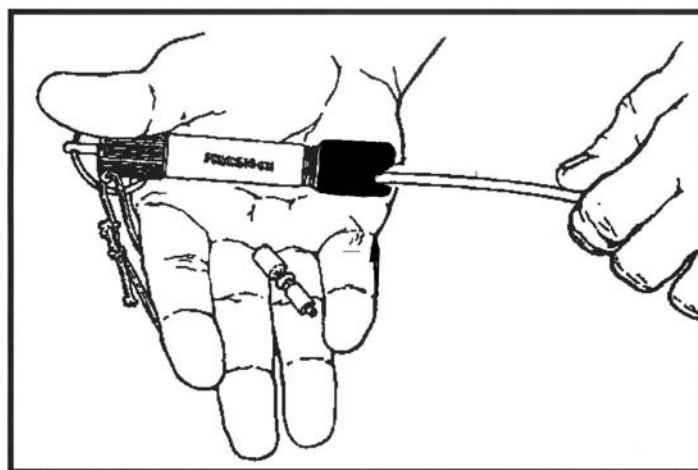


Figure 052-193-1312-4  
M81 and Shock Tube



**Performance Steps**

- (4) Turn the igniter's end cap clockwise, once the shock tube is seated. Finger tighten to secure the shock tube into the igniter.
- (5) Hold the igniter securely, and pull lightly on the tube to ensure that it is secure.
- d. Actuate the M81 fuse igniter to initiate the system, on command from the officer in charge (OIC) or noncommissioned officer in charge (NCOIC).
  - (1) Squeeze together the spread legs of the safety cotter pin.
  - (2) Use the safety pin cord to remove the safety cotter pin from the igniter's body.
  - (3) Actuate the igniter by sharply pulling its pull ring. The pop of the igniter's primer should be heard.

NOTE: If the primer does not fire the M81, it can be recocked and reactivated by holding the igniter firmly and pushing the pull rod back into the igniter until a click is heard or felt, and again, sharply pulling the pull ring to actuate it.

2. Construct a delay initiation set.

NOTE: The M14 delay will allow up to a 5-minute delay before detonation. Each yellow band indicates a 1-minute delay.

- a. MDI demolition firing system. Open both of the hinged flaps on the M9 holder, and insert the M14 blasting cap into the cap slot and snap the flap shut. Loop the firing-system shock tube into a 6-inch bite around the M9 holder, and insert the shock tube into the channels of the holder. Snap the hinged flap shut, and secure it with tape (refer to Figure 052-193-1312-1).
- b. Detonating-cord demolition firing system. Open both hinged flaps on the M9 holder, insert the M14 blasting cap into the cap slot, and snap the flap shut. Loop the firing system detonating cord into a 6-inch bite around the M9 holder, and insert the detonating cord into the channels of the holder. Snap the hinged flap shut, and secure it with tape (refer to Figure 052-193-1312-2).
- c. Connect the M81 fuse igniter to the shock tube.
  - (1) Turn the M81 end cap one-half turn counterclockwise, and pull the shipping plug out of the igniter (refer to Figure 052-193-1312-3).
  - (2) Cut off the crimped, sealed end of the M14 delay blasting-cap tube.
  - (3) Push the tube into the M81's end cap as far as it will go (refer to Figure 052-193-1312-4).
  - (4) Turn the igniter's end cap clockwise. Once the shock tube is seated, finger tighten to secure the shock tube into the igniter.
  - (5) Hold the igniter securely, and pull lightly on the tube to ensure that it is secure.
- d. Initiate the system on command from the OIC/NCOIC, and actuate the M81 fuse igniter.
  - (1) Squeeze together the spread legs of the safety cotter pin.
  - (2) Use the safety pin cord to remove the safety cotter pin from the igniter's body.
  - (3) Actuate the igniter by sharply pulling its pull ring. The pop of the igniter's primer should be heard.

NOTE: If the primer does not fire the M81, it can be recocked and reactivated by holding the igniter firmly and pushing the pull rod back into the igniter until a click is heard or felt and again sharply pulling the pull ring to actuate it.

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions statement.

Brief soldier: Tell the soldier to construct a demolition initiation set using command initiation and delay initiation.

**Performance Measures**

	<b><u>GO</u></b>	<b><u>NO GO</u></b>
1. Constructed a command initiation set.	_____	_____
2. Constructed a delay initiation set.	_____	_____

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

**References  
Required**

**Related**  
FM 5-250

**Identify Characteristics of Military Demolitions and Explosives**  
**052-193-1313**

**Conditions:** As a combat engineer squad member in a field environment, given various types of military demolitions and explosives according to Field Manual (FM) 5-250.

**Standards:** Identify the characteristics of military demolitions and explosives correctly according to FM 5-250.

**Performance Steps**

1. Identify the characteristics of United States (US) demolitions and explosives. See Table 052-193-1313-1.

**Performance Steps**

Name	Applications	Detonation Velocity		RE Factor*	Fume Toxicity	Water Resistance
		Min/Sec	Ft/Sec			
Ammonium nitrate	Cratering charge	2,700	8,900	0.42	Dangerous	Poor
PETN	Detonating cord Blasting caps Demolition charges	8,300	27,200	1.66	Slight	Excellent
RDX	Blasting caps Composition explosive	8,350	27,400	1.60	Dangerous	Excellent
(TNT)	Demolition charge Composition explosive	6,900	22,600	1.00	Dangerous	Excellent
Tetryl	Booster charge Composition explosive	7,100	23,300	1.25	Dangerous	Excellent
Nitroglycerin	Commercial dynamite	7,700	25,200	1.50	Dangerous	Good
Black powder	Time fuse	400	1,300	0.55	Dangerous	Poor
Amatol 80/20	Bursting charge	4,900	16,000	1.17	Dangerous	Poor
Composition A3	Booster charge Bursting charge	8,100	26,500	---	Dangerous	Good
Composition B	Bursting charge	7,800	25,600	1.35	Dangerous	Excellent
Composition C4 (M112)	Cutting charge Breaching charge	8,040	26,400	1.34	Slight	Excellent
Composition H6	Cratering charge	7,190	23,600	1.33	Dangerous	Excellent
Tetrytol 75/25	Demolition charge	7,000	23,000	1.20	Dangerous	Excellent
Pentolite 50/50	Booster charge Bursting charge	7,450	24,400	---	Dangerous	Excellent
M1 dynamite	Demolition charge	6,100	20,000	0.92	Dangerous	Fair
Detonating cord	Priming, demolition charge	6,100 to 7,300	20,000 to 24,000	---	Slight	Excellent
Sheet explosive M118 and M186	Cutting charge	7,300	24,000	1.14	Dangerous	Excellent
Bangalore torpedo, M1A2	Demolition charge	7,800	25,600	1.17	Dangerous	Excellent
Shaped charges M2A3, M2A4, and M3A1	Cutting charge	7,800	25,600	1.17	Dangerous	Excellent
*TNT equals 1.00 RE.						

Table 052-193-1313-1  
Characteristics of US Demolitions and Explosives

2. Identify the characteristics of block demolition charges. See Table 052-193-1313-2.

## Performance Steps

Explosive	Unit (lb)	Size (in)	Detonation Velocity		RE Factor	Packaging/ Weight <sup>3</sup>
			Min/Sec	Ft/Sec		
TNT <sup>1</sup>	0.25	1 <sup>1</sup> / <sub>2</sub> x 3 <sup>1</sup> / <sub>2</sub>	6,900	22,600	1.00	192 per box/55 lb
	0.50	1 <sup>3</sup> / <sub>4</sub> x 1 <sup>3</sup> / <sub>4</sub> x 3 <sup>3</sup> / <sub>4</sub>	6,900	22,600	1.00	96 per box/53 lb
	1.00	1 <sup>3</sup> / <sub>4</sub> x 1 <sup>3</sup> / <sub>4</sub> x 7	6,900	22,600	1.00	48 per box/53 lb
M112 block <sup>2</sup>	1.25	1 x 2 x 10	8,040	26,400	1.34	30 per box/40 lb
M118 block	2.00	1 x 3 x 12	7,300	24,000	1.14	2-lb block; 20 per box/42 lb; 4 sheets per package
M118 sheet <sup>2</sup>	0.50	1 <sup>1</sup> / <sub>4</sub> x 3 x 12	7,300	24,000	1.14	
M186 roll	25.00	1 <sup>1</sup> / <sub>4</sub> x 3 x 600	7,300	24,000	1.14	3 per box/80 lb
Composition H6 <sup>1</sup>	43.00	7 x 20	7,190	23,600	1.33	1 per box/52 lb
M1 dynamite <sup>1</sup>	0.50	1 <sup>1</sup> / <sub>4</sub> x 8	6,100	20,000	0.92	100 per box/62 lb
<sup>1</sup> The 1/4 block of TNT, composition H6 cratering charge, and M1 dynamite are cylindrical in shape and described in terms of diameter and length. <sup>2</sup> The volume of M112 is 20 cu in. The volume of one sheet of M118 is 9 cu in. <sup>3</sup> Packaging weights include packaging material and weight of container.						

Table 052-193-1313-2  
Characteristics of Block Demolition Charges

**Evaluation Preparation:** Setup: FM 5-250 for reference.

Brief soldier: Tell the soldier to explain the characteristics of military demolitions and explosives.

### Performance Measures

1. Identified the characteristics of US demolitions and explosives.
2. Identified the characteristics of block demolition charges.

**GO**    **NO GO**

\_\_\_\_    \_\_\_\_  
\_\_\_\_    \_\_\_\_

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

### References

**Required**  
FM 5-250

**Related**  
GTA 05-10-033

## Subject Area 3: Basic Combat Construction

**Install Wire Obstacle Materials****052-195-1020**

**Conditions:** As a combat engineer squad member in a field environment, given U-shaped pickets, barbed wire, concertina, wire gauntlets, wooden sticks, a picket driving cap, a sledgehammer or a picket pounder, ground staples, and a suitable working area with the known expected direction of enemy travel.

**Standards:** Insert U-shaped pickets, ensuring that the concave side faces the enemy and that the lower notch is about 4 inches off of the ground. Make correct barbed wire and apron ties. Tighten loose wire by racking, laying out, and installing concertina.

**Performance Steps**

1. Install a U-shaped picket to support the fencing material.
  - a. Install the U-shaped picket with a driving cap and a sledgehammer.
    - (1) Lay the picket on the ground with the narrow end pointing toward the enemy and the concave side facing skyward.
    - (2) Place a picket driving cap over the top of the picket.

NOTE: The top of the picket is the wide end that faces away from the enemy.

- (3) Stand the picket on the narrow end, and pound on the driving cap with a sledgehammer until the lower notch of the picket is approximately 4 inches off of the ground.

NOTE: The concave side of the picket must face the enemy.

- b. Install the U-shaped picket with a picket pounder.
    - (1) Lay the picket on the ground so the narrow end is pointing toward the enemy and the concave side is facing skyward.
    - (2) Place a picket pounder over the top of the picket.

NOTE: Many engineer units make their own picket pounders. The picket pounder is easier for one-man picket installation than the driving cap and sledgehammer.

- (3) Stand the picket on the narrow end, and raise and lower the picket pounder. Drive the picket into the ground until the lower notch of the picket is approximately 4 inches off of the ground.

NOTE: The concave side of the picket must face the enemy.

2. Make barbed-wire posts and apron ties, and tighten loose wire by racking.

**WARNING:** USE WIRE GAUNTLETS WHEN WORKING WITH BARBED WIRE TO AVOID HAND INJURY.

- a. Make barbed-wire post ties (Figure 052-195-1020-1).

## Performance Steps

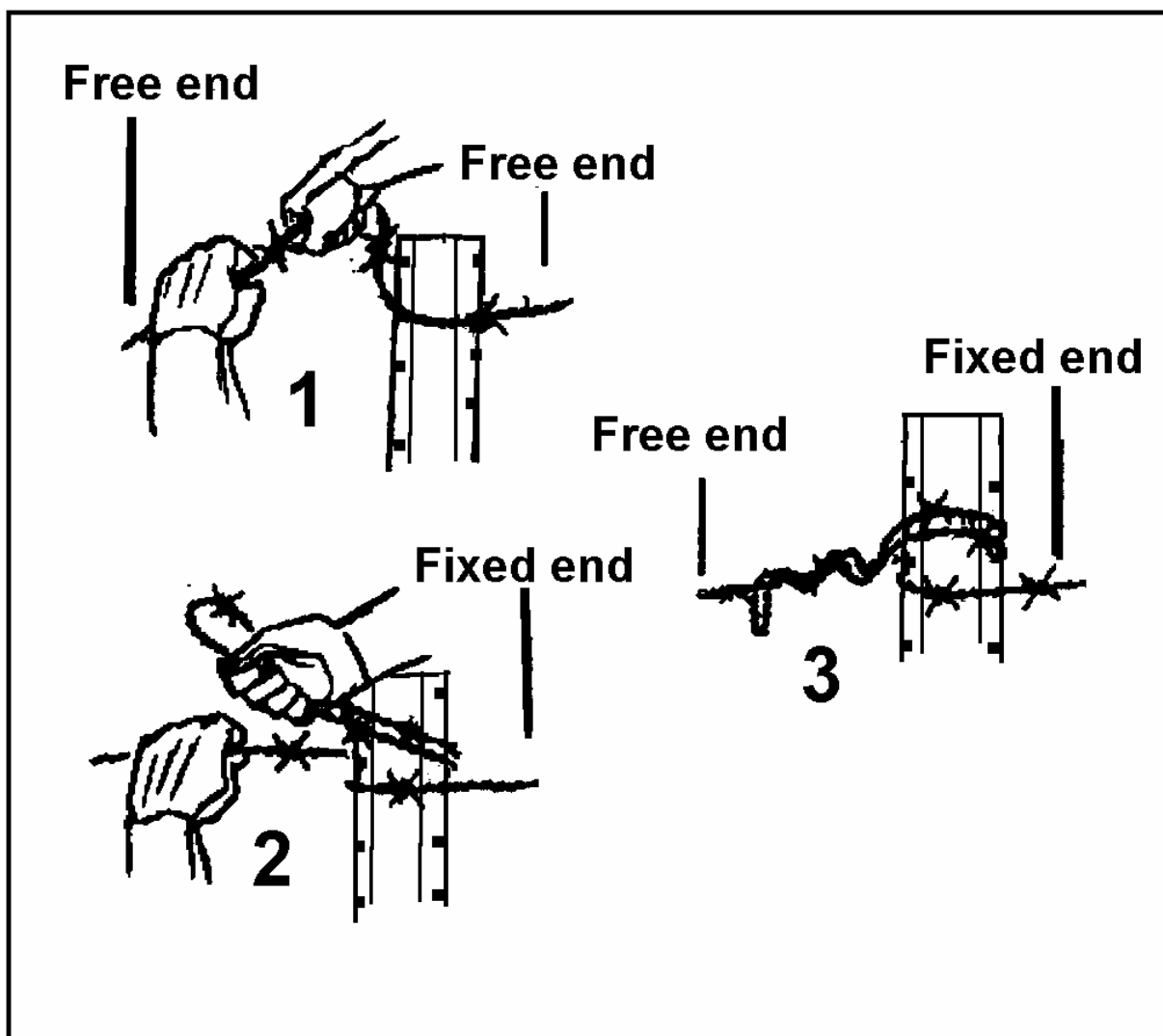


Figure 052-195-1020-1  
Post Tie

NOTE: Use the post tie to fasten standard barbed wire to wooden posts or to U-shaped pickets.

- (1) With your palm down, reach around the picket, over the fixed end, and take a loop from the free end.
  - (2) Wrap the loop around the post above the fixed end.
  - (3) Wrap the loop around the free end at least two turns to complete the tie.
- b. Make barbed-wire apron ties (Figure 052-195-1020-2).

## Performance Steps

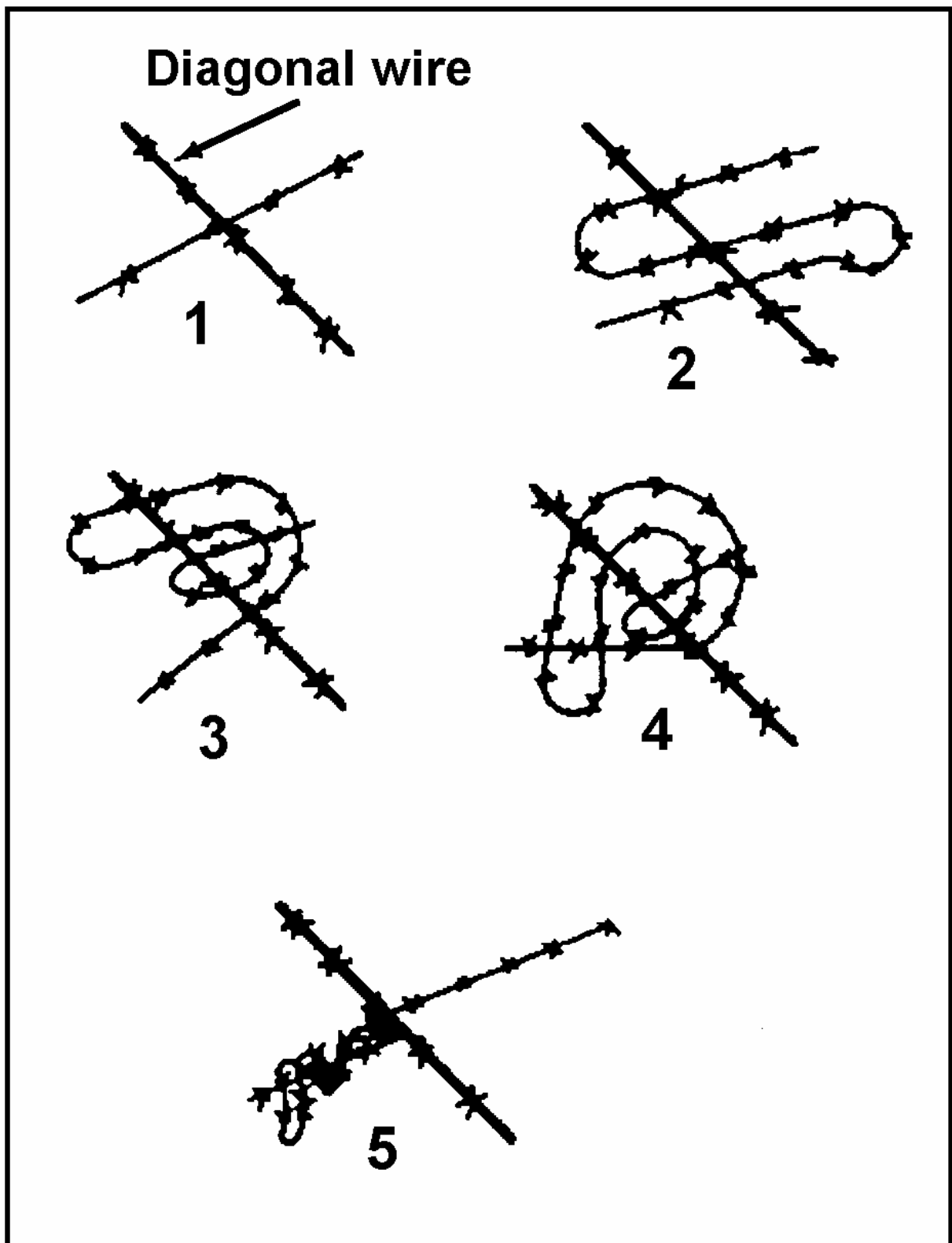


Figure 052-195-1020-2  
Apron Tie



**Performance Steps**

NOTE: Use the apron tie whenever two wires that cross must be tied together.

- (1) Draw a large loop from the free end back under the wire.
  - (2) Bring the loop up and over the top of the diagonal wire.
  - (3) Bring the loop down and under the free end.
  - (4) Wind the loop around the free end at least two complete turns.
- c. Tighten loose wires by racking with a short stick. Rack the wire in the middle, not at the ties or where wires intersect (Figure 052-195-1020-3).

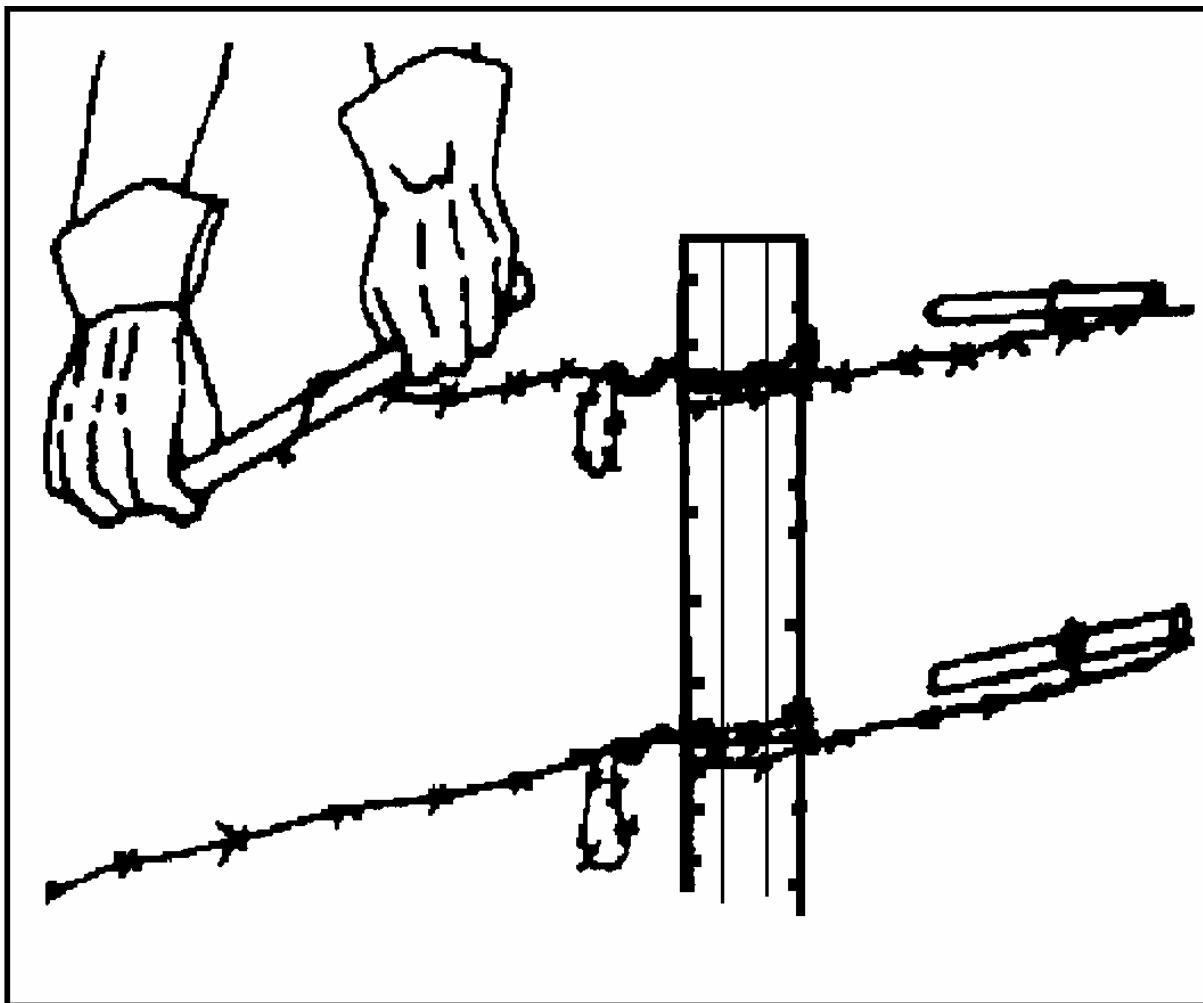


Figure 052-195-1020-3  
Tighten Loose Wire by Racking

3. Install and collapse concertina wire.

NOTE: Use wire gauntlets when working with concertina to avoid hand injury.

- a. Lay out concertina.

NOTE: When carrying a roll of concertina, step inside the roll, grasp the carrying handles, lift the roll about waist high, and carry it to the required location.

- (1) Untie the plain-wire bindings from around the quarter points of the coil. Leave the plain-wire bindings attached to one end hoop.

NOTE: Concertina should never be extended longer than 49.2 feet and should not be used across openings less than 16.4 feet. Normally, a minimum of two soldiers will extend concertina, although one soldier can extend concertina as described in this task.

**Performance Steps**

- (2) Grasp the top end-hoop carrying handles with the loose coil laid flat on the ground, then lift the end hoop upward. Extend the concertina by bouncing the extended coil in a line parallel to the desired fence line until about half of the coil is extended.

NOTE: During the extending procedure, do not overextend short portions of the extending coil. When snags and uneven hoops occur, stop and loosen the snags and hoops to ensure that the concertina opens and extends evenly without distorting its shape.

- (3) Extend the remaining half of the coil by first lifting the bottom end-hoop carrying handles. Grasp both carrying handles and extend the second half by bouncing the coil in the same manner as the first half of the coil.

b. Install concertina.

NOTE: Personnel will remain on the friendly side of the fence at all times.

- (1) Place the end hoop over the end picket.
  - (a) Grasp the side of the coil and end hoop while facing the extended concertina from the friendly side.
  - (b) Lift and place the lower and upper midpoints of the first coil over the end picket.

NOTE: The middle coils of concertina are simply lifted and placed over the individual pickets along the fence line.

- (2) Connect concertina when joining concertinas over a picket (Figure 052-195-1020-4).

## Performance Steps

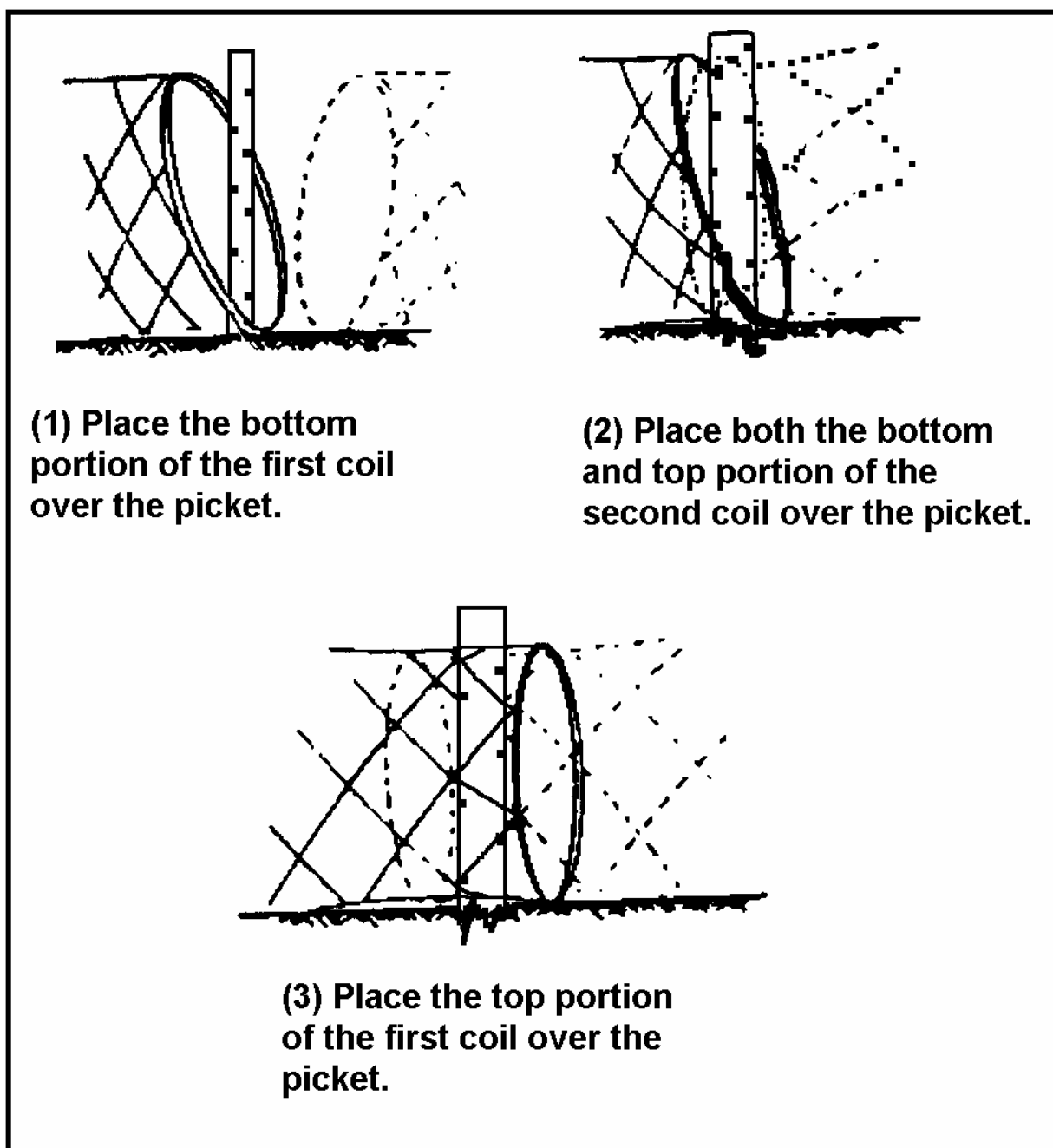


Figure 052-195-1020-4  
Joining Concertinas

- (a) Grasp the side of the coil and end hoop while facing the extended concertina from the friendly side.
- (b) Lift and place the lower midpoint of the first coil over the picket.
- (c) Place the second concertina's first coil over the picket in the same manner as over an end picket.
- (d) Lift the upper midpoint of the first coil on the first concertina over the picket while pushing downward on the second concertina's first coil.

**Performance Steps**

- (3) Connect concertina when joining concertinas without a picket.
  - (a) Insert the first coil of one concertina inside the first coil of the second concertina.
  - (b) Use plain steel wire (binding wire) to tie the two concertinas together.
- c. Install ground staples.

- (1) Hammer ground staples into the ground. Keep the hoop wire between the staple legs.
- (2) Install a ground staple over each pair of end hoops at the bottom of the coil and at the quarter points between the pickets.

NOTE: The enemy-row concertinas are always stapled to the ground.

- d. Install horizontal wire.

- (1) Stretch a strand of barbed wire along the top of the extended concertina.
- (2) Use a post tie to tie the barbed wire to each picket (Figure 052-195-1020-5).

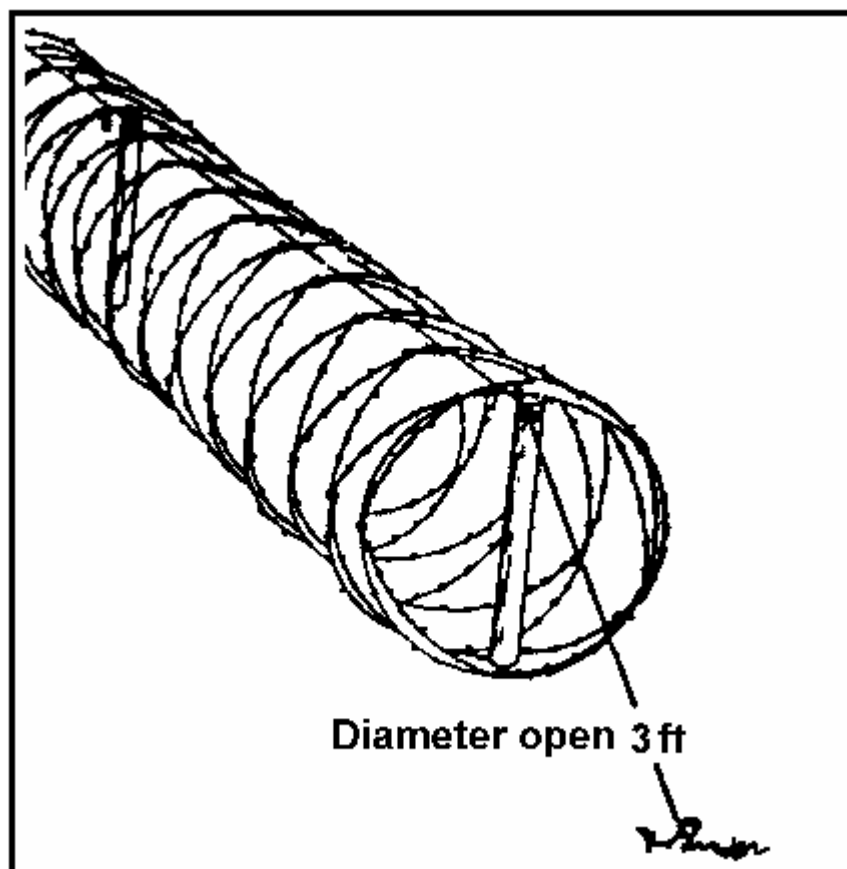


Figure 052-195-1020-5  
Anchored Concertina

NOTE: The horizontal wire should be as tight as possible to improve the resistance of the fence against crushing. Racking may be required.

- (3) Stagger the end hoops and the joints of multirow fences.
  - (a) Stagger the rows of double-concertina fences every 2.5 paces.
  - (b) Stagger the top row of triple-concertina fences between the lower two rows of concertina.
- (4) Install and rack a top-row concertina.
  - (a) Extend and join concertina as required for the top row.
  - (b) Lift the concertina from the friendly side and place the coils in the trough formed by the bottom rows.

**Performance Steps**

- (c) Rack the top-row concertina to the rear horizontal wire at points halfway between the rear-row long pickets.
- (d) If the noncommissioned officer in charge (NCOIC) authorizes access to the enemy side of the fence, similarly rack the top-row concertina to the forward horizontal wire.

NOTE: The end hoops at each end of the top row are racked to the rear horizontal wire between the anchor picket and the end long picket.

e. Collapse the concertinas.

NOTE: Normally, a minimum of two soldiers will collapse concertinas, although one soldier can collapse concertinas as described in this task.

- (1) Remove the horizontal wire from the concertina.
- (2) Remove kinks in the coils, tighten loose clips, or replace missing clips with plain binding wire.
- (3) Place a foot at the bottom of one end of the hoop, and grasp the top carrying handle.
- (4) Walk toward the other end hoop while feeding the wire into your hand and against your foot.
- (5) Lay the loose coil flat on the ground, when closed, and compress it with your feet.
- (6) Remove the plain-wire bindings from the handles, and tie the coil at quarter points.

**Evaluation Preparation:** NOTE: This task may be used to evaluate more than one soldier at one time on the overall installation of a barbed-wire fence or a concertina-wire obstacle.

Setup: Provide the soldier(s) with the items listed in the conditions statement.

Brief soldier: Ensure that the soldier(s) know the evaluation standard before beginning the task.

**Performance Measures**

	<b><u>GO</u></b>	<b><u>NO GO</u></b>
1. Installed the picket with a driving cap and sledgehammer.	—	—
2. Installed the picket with a picket pounder.	—	—
3. Made barbed-wire post ties.	—	—
4. Made barbed-wire apron ties.	—	—
5. Tightened loose wire by racking.	—	—
6. Laid out concertina.	—	—
7. Installed concertina.	—	—
8. Installed ground staples.	—	—
9. Installed horizontal wire.	—	—
10. Collapsed concertina.	—	—

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

**References**

**Required**

**Related**

FM 5-102

FM 5-34

## Subject Area 4: Basic Equipment Maintenance

**Perform Operator Preventive-Maintenance Checks and Services (PMCS)****052-201-1180**

**Conditions:** As a combat engineer in a field environment, given a piece of equipment, the appropriate technical manual (TM), Department of the Army (DA) Form 5988-E, and a pen.

**Standards:** Verify the equipment data on a DA Form 5988-E. Ensure that the equipment matches the appropriate TM. Perform PMCS on the equipment, and record all of the faults on the DA Form 5988-E. Correct any operator level shortcomings and update the changes on DA Form 5988-E. Turn in the completed DA Form(s) 5988-E to the immediate supervisor.

**Performance Steps**

1. Prepare the vehicle for inspection by verifying the equipment listed on the existing DA Form 5988-E. Line out incorrect data, and replace it with the correct information. The DA Form 5988-E is broken down into the following three sections:
  - a. Section 1: Equipment Data.
    - (1) Administration number: Bumper number on the vehicle.
    - (2) Equipment model: Model of the equipment.
    - (3) Equipment noun: Nomenclature; enter the noun abbreviation of the equipment.
    - (4) Equipment national stock number (NSN): Equipment NSN.
    - (5) Equipment serial number: Enter the NSN when no serial number is available.
    - (6) Registration number: The vehicle's registration number. Enter the NSN when no registration number is available.
    - (7) Type of inspection: Enter the type of PMCS performed.
    - (8) Current reading: If no entry is shown, write in the current reading. To add a reading in miles, begin with an "m"; in kilometers, begin with a "k"; and in hours, begin with an "h."
    - (9) Publication: If no entry is shown, write in all of the publications used for the piece of equipment, the date the publication was written, and any changes to the publication's number.
    - (10) Signature block: The operator performing the PMCS signs and dates the form upon completion of the PMCS.
  - b. Section 2: Parts Requested.
    - (1) Fault: The symbol identifies a deficiency or a shortcoming.
    - (2) Document number: Tracks the part that is ordered.
    - (3) National item identification number (NIIN): Shows the last eight numbers of the part number.
    - (4) NOUN: Shows the part's name.
    - (5) Quantity due/received: How many parts were ordered/how many parts have been received.
    - (6) Status date: The date the fault was entered.
    - (7) Date completed: The date the fault was corrected.
    - (8) Priority: The number representing the urgency requirement for the part.
    - (9) Deadline code (DLC): yes/no.
  - c. Section 3: Maintenance Faults.
    - (1) Item number: The inspection number from the TM.
    - (2) Fault date: The date the fault was found.
    - (3) Fault status: The symbol identifies the shortcoming or the deficiency.
    - (4) Fault description: Briefly describe the fault.
    - (5) Corrective action: Briefly describe the action taken to correct the fault.
    - (6) Operator hours and license number: Enter the time taken to correct the deficiency and the license number or social security number (SSN) of the operator or mechanic.

**Performance Steps****NOTES:**

1. Fault is a term used to indicate that a piece of equipment has a deficiency or shortcoming.
  2. A deficiency is a problem that causes the equipment to malfunction and makes the equipment nonmission capable (NMC).
  3. A shortcoming is a fault that requires maintenance or supply action on a piece of equipment but does not render the equipment NMC.
2. Refer to the TM which contains the required technical information to complete the inspection, services, adjustments, removal, installation, and testing on the equipment and its components.
    - a. Verify that the TM number on the equipment data plate matches the TM number listed on the manual's cover and on DA Form 5988-E. Ensure that the manual's date is the most current and that all changes are included.
    - b. Note that the TM cover contains the following information:
      - (1) The complete nomenclature and description of the equipment and the NSN for the piece of equipment covered in the manual.
      - (2) The branch or branches of service that are authorized to use the manual.
      - (3) Some manuals come with a quick chapter reference, located in the right-hand corner of the cover.
      - (4) Some manuals indicate how many changes have been included.
    - c. Note that the TM number consists of the following information:
      - (1) The first number indicates the general type of equipment that is covered in the manual. For example, the number 5 stands for engineer equipment, and the number 9 stands for ordnance equipment.
      - (2) The second group of numbers is the federal supply class or group. The four-digit code refers to a more specific type of equipment. For example, the number 3805 represents earthmoving, excavating, and highway maintenance equipment.
      - (3) The third set of numbers are the numerical sequence. This group of numbers pertains to the specific model and make of the equipment. For example, the number 226 identifies the manual as containing information related to the M48 armored vehicle launcher.
      - (4) The last two numbers signify the category of maintenance or the level covered by the manual. For example, the number 10 stands for operator-level maintenance. When a manual applies to more than one category of maintenance, the first digit will indicate the lowest level, and the second digit will indicate the highest level. For example, the number 24 indicates that unit-level, intermediate direct-support, and intermediate general-support maintenance are covered in the manual. The number 24 and the letter "P" indicate that instruction in maintenance and repair parts are covered in the manual.
  3. Verify the information, use the TM to perform PMCS on the equipment, and record the faults on DA Form 5988-E.

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions.

**Brief soldier:** Tell the soldier to perform PMCS on the equipment, and record all of the faults on a DA Form 5988-E.

**Performance Measures**

	<u><b>GO</b></u>	<u><b>NO GO</b></u>
1. Prepared the vehicle for inspection by verifying the equipment data listed on DA Form 5988-E.	—	—
2. Referenced the TM containing the required technical information.	—	—
3. Verified the information, used the TM to perform PMCS on the equipment, and recorded the faults on DA Form 5988-E.	—	—

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

**References****Required**

DA FORM 5988-E

**Related**

DA PAM 750-35



## Perform Preventive-Maintenance Checks and Services (PMCS) on the Bridge of the Armored-Vehicle-Launched Bridge (AVLB)

**052-226-1012**

**Conditions:** As an AVLB operator in a field environment, given an AVLB (an M48 or M60 tank chassis) with a track commander (TC), a Department of the Army (DA) Form 2404 or DA Form 5988-E, Technical Manual (TM) 5-5420-203-14, and cleaning material.

**Standards:** Refer to TM 5-5420-203-14 to perform PMCS. Identify all deficiencies or shortcomings, and correct those at the crew level. Report all other deficiencies to organizational maintenance on a DA Form 2404 or DA 5988-E. Observe all safety precautions and avoid injury to personnel and equipment damage.

### Performance Steps

NOTE: Reference TM 5-5420-203-14 and perform PMCS on the AVLB.

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions statement. The task may be manipulated to include deficiencies on the equipment.

Brief soldier: Tell the soldier that he will be required to complete the performance measures according to the standards set forth in the task.

Performance Measures	<u>GO</u>	<u>NO GO</u>
1. Referenced TM 5-5420-203-14 and performed PMCS on the AVLB.	—	—
2. Followed the proper inspection interval, depending on the time of the equipment's usage, to perform a before-, during-, or after-operation PMCS.	—	—
3. Corrected all crew-level deficiencies or shortcomings.	—	—
4. Reported all other deficiencies or shortcomings to organizational maintenance on a DA Form 2404 or DA Form 5988-E.	—	—
5. Observed safety precautions, and avoided injury to personnel and equipment damage.	—	—

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

### References

#### Required

DA FORM 2404  
DA FORM 5988-E  
TM 5-5420-203-14

#### Related

## Perform Preventive-Maintenance Checks and Services (PMCS) on the Launcher of an Armored-Vehicle-Launched Bridge (AVLB)

**052-226-1101**

**Conditions:** As an AVLB operator in a field environment, given an AVLB (an M48 or M60 tank chassis) with a track commander (TC), a Department of the Army (DA) Form 2404 or 5988-E, Technical Manual (TM) 5-5420-226-10 or TM 5-5420-202-10, Lubrication Order (LO) 5-5420-226-12 or LO 5-5420-202-12, the appropriate lubricants, and cleaning materials.

**Standards:** Reference TM 5-5420-226-10 or TM -5420-202-10 to perform the vehicle inspection. Identify all deficiencies or shortcomings, and correct those at the crew level. Report all other deficiencies or shortcomings to organizational maintenance on a DA Form 2404 or 5988-E. Observe all safety precautions and avoid injury to personnel or damage to equipment.

### Performance Steps

Reference TM 5-5420-226-10 or TM 5-5420-202-10 and LO 5-5420-226-12 or LO 5-5420-202-12 to perform PMCS on the AVLB.

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions statement. The task may be manipulated to include deficiencies on the equipment.

Brief soldier: Tell the soldier that he will be required to complete the performance measures according to the standards set forth in this task.

Performance Measures	<u>GO</u>	<u>NO GO</u>
1. Referenced TM 5-5420-226-10 or TM 5-5420-202-10 and LO 5-5420-226-12 or LO 5-5420-202-12 to perform PMCS on the AVLB.	—	—
2. Followed the proper inspection interval, depending on the time of the equipment's use, to perform a before-, during-, or after-operation PMCS.	—	—
3. Corrected all identified crew-level deficiencies or shortcomings.	—	—
4. Reported all other deficiencies or shortcomings on a DA Form 2404 or 5988-E.	—	—
5. Observed safety precautions and avoided injury to personnel and equipment damage.	—	—

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

### References

#### Required

DA FORM 2404  
DA FORM 5988-E  
LO 5-5420-202-12  
LO 5-5420-226-12  
TM 5-5420-202-10  
TM 5-5420-226-10

#### Related

## Repair Track Components on an Armored-Vehicle-Launched Bridge (AVLB)

**052-226-1260**

**Conditions:** As an AVLB operator in a field environment, given an AVLB (an M48 or M60 tank chassis) with damaged, loose, or missing track components; basic-issue items (BIs); a completed before-operation preventive- maintenance checks and services (PMCS); a track commander (TC); Technical Manual (TM) 5-5420-202-10 or TM 5-5420-226-10; replacement parts; and a suitable working area with level ground.

**Standards:** Identify all damaged, loose, or missing track components, and repair or replace the track components without causing injury to personnel or equipment damage.

### Performance Steps

NOTE: Reference TM 5-5420-202-10 or TM 5-5420-226-10 to perform PMCS.

**Evaluation Preparation:** Set up: Provide the soldier with the items listed in the conditions. Prepare the vehicle by loosening or removing the track components.

Brief soldier: Tell the soldier to perform this task with the TC. If the vehicle is to be moved, the soldier should follow the signals and instructions from the TC. The TC will assist where physically necessary, as in lifting heavy objects or heavy torques on the nuts or the bolts.

Performance Measures	<u>GO</u>	<u>NO GO</u>
1. Referenced TM 5-5420-202-10 or TM 5-5420-226-10 to perform PMCS.	—	—
2. Identified all damaged, loose, or missing vehicle track components.	—	—
3. Followed the signals and instructions given by the TC.	—	—
4. Repaired or replaced the damaged, loose, or missing vehicle track components without causing injury to personnel or equipment damage.	—	—

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

### References

#### Required

TM 5-5420-202-10  
TM 5-5420-226-10

#### Related

## Repair Track Components on an Armored Combat Earthmover (ACE), M9

### 052-227-0110

**Conditions:** As a combat engineer in a field environment, given an ACE with damaged, loose, or missing track components; basic-issue items (BIIs), a completed before-operation preventive-maintenance checks and services (PMCS); a track commander (TC); an assistant; Technical Manual (TM) 5-2350-262-10; replacement parts; and a suitable working area with level ground.

**Standards:** Identify all damaged, loose, or missing track components. Repair or replace the track components without causing injury to personnel or equipment damage.

#### Performance Steps

NOTE: Reference TM 5-2350-262-10 to perform PMCS.

**Evaluation Preparation:** Set up: Provide the soldier with the items listed in the conditions. Prepare the vehicle by loosening or removing the track components.

Brief soldier: Tell the soldier to perform this task with the assistant. If the vehicle is to be moved, the soldier should follow the signals and the instructions from the assistant. The assistant will assist the soldier when physically necessary, as with lifting heavy objects or heavy torques on the nuts or the bolts.

Performance Measures	<u>GO</u>	<u>NO GO</u>
1. Referenced TM 5-2350-262-10 to perform PMCS.	—	—
2. Identified all damaged, loose, or missing vehicle track components.	—	—
3. Followed the signals and instructions given by the TC.	—	—
4. Repaired or replaced the damaged, loose, or missing vehicle track components without causing injury to personnel or equipment damage.	—	—

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

#### References

##### Required

TM 5-2350-262-10

##### Related

## Perform Operator Preventive-Maintenance Checks and Services (PMCS) on an Armored Combat Earthmover (ACE), M9

**052-227-1005**

**Conditions:** As an ACE operator in a field environment, given an ACE, a Department of the Army (DA) Form 2404 or 5988-E, Technical Manual (TM) 5-2350-262-10, Lubrication Order (LO) 5-2350-262-12, the appropriate lubricants, and cleaning materials.

**Standards:** Reference TM 5-2350-262-10 to perform a vehicle inspection. Identify any deficiencies or shortcomings and correct those at the crew level. Report all other deficiencies to organizational maintenance on DA Form 2404 or DA Form 5988-E. Observe all safety precautions and prevent injury to personnel or equipment damage.

### Performance Steps

1. Reference TM 5-2350-262-10 and LO 5-2350-262-12 to perform PMCS on an ACE.

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions. The task may be manipulated to include deficiencies on the equipment.

Brief soldier: Tell the soldier that he will be required to complete the performance measures according to the standards set forth in this task.

Performance Measures	<u>GO</u>	<u>NO GO</u>
1. Referenced TM 5-2350-262-10 and LO 5-2350-262-12 to perform PMCS on an ACE.	—	—
2. Followed the proper inspection interval, depending on the time of the equipment's use, to perform a before-, during-, or after-operation PMCS.	—	—
3. Corrected crew-level deficiencies or shortcomings, if possible.	—	—
4. Reported all other deficiencies or shortcomings on DA Form 2404 or DA Form 5988-E.	—	—
5. Observed safety precautions and avoided injury to personnel and equipment damage.	—	—

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

### References

#### Required

DA FORM 2404  
DA FORM 5988-E  
LO 5-2350-262-12  
TM 5-2350-262-10

#### Related

**Disconnect the Final Drives on an Armored Combat Earthmover (ACE), M9**  
**052-227-1104**

**Conditions:** As an ACE operator in a field environment, given an ACE with a completed before-operation preventive-maintenance checks and services (PMCS); basic-issue items (BIs); cleaning materials (rags, dry sweep, and drip cans); and a working area.

**Standards:** Disconnect the final drives on the ACE, without causing damage to the equipment or the environment.

**Performance Steps**

1. Ensure that the vehicle's hand brake is engaged.

NOTE: Both of the final drives are disconnected the same way. The right side is shown for this task.

2. Lift and remove the three rear-floor plates.
3. Disconnect the final-drive fill hose from the connector and the elbow (Figure 052-227-1104-1).
4. Remove the four screws and the four rear-floor plate braces (Figure 052-227-1104-1).

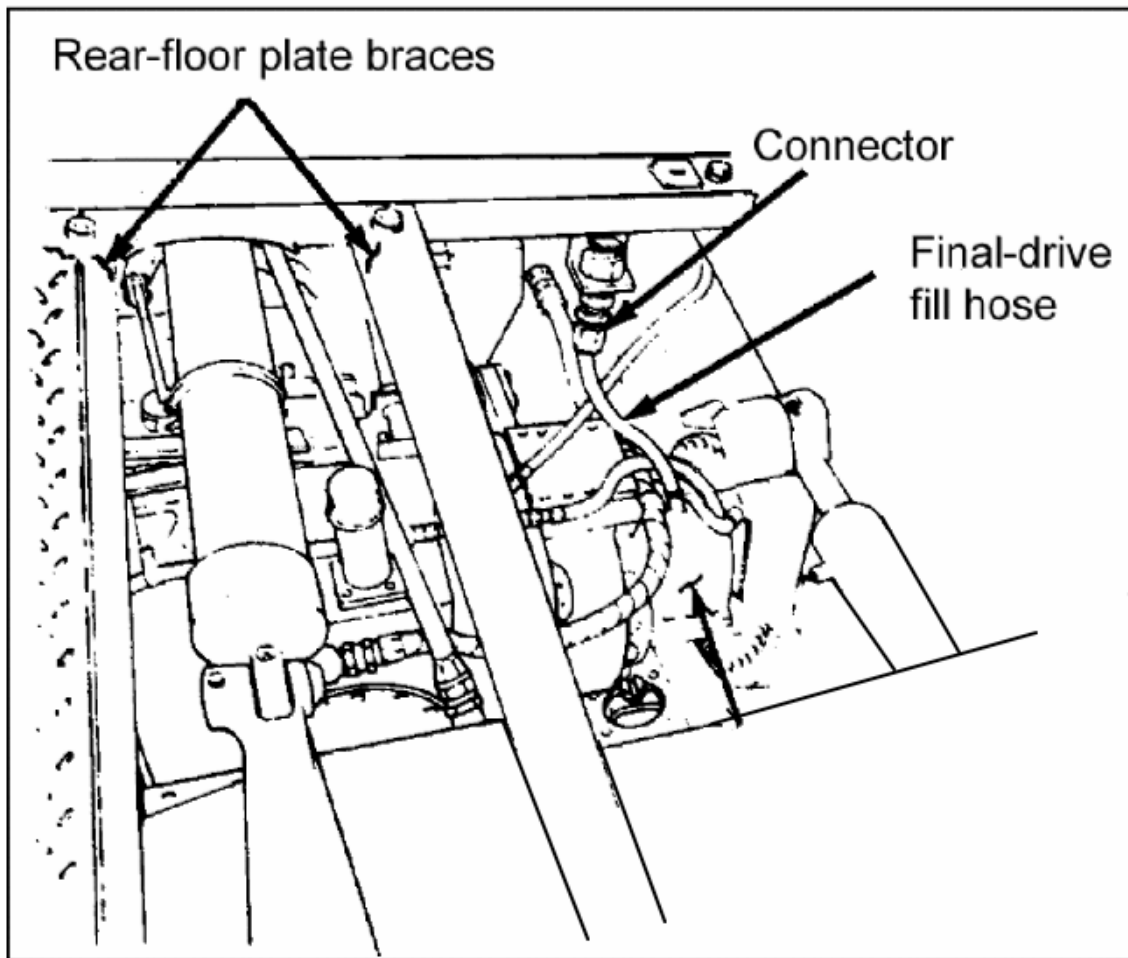
**Performance Steps**

Figure 052-227-1104-1  
Disconnecting the Final-Drive Fill Hose

5. Remove the six screws, the six washers, and the final-drive cap from the final-drive flange (Figure 052-227-1104-2).

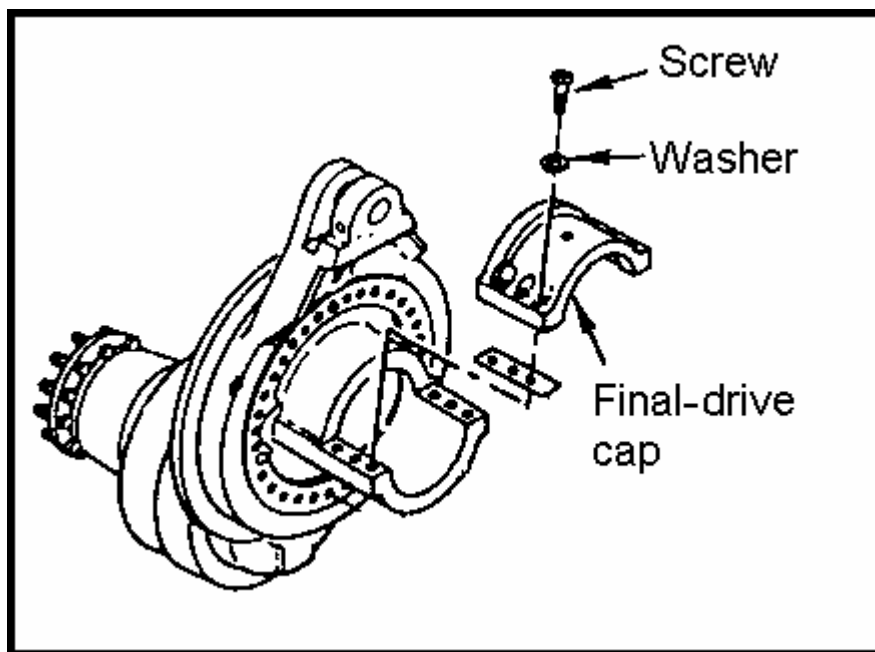
**Performance Steps**

Figure 052-227-1104-2  
Removing Screws From the Final-Drive Flange

6. Use a screwdriver to pry loose the tabs on the nut (Figure 052-227-1104-3).

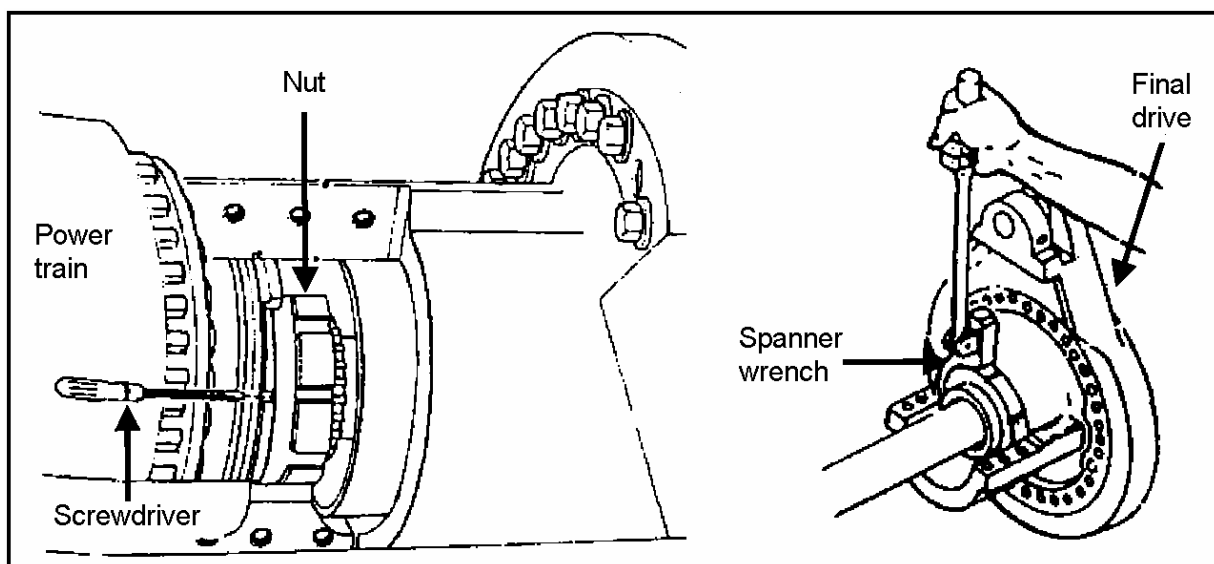


Figure 052-227-1104-3  
Removing the Final-Drive Cap

7. Use a spanner wrench to loosen the nut. Slide the nut toward the final drive (Figure 052-227-1104-3).



**Performance Steps**

8. Separate the final-drive input shaft from the steering-unit coupling. Push the input shaft into the final drive (Figure 052-227-1104-4).

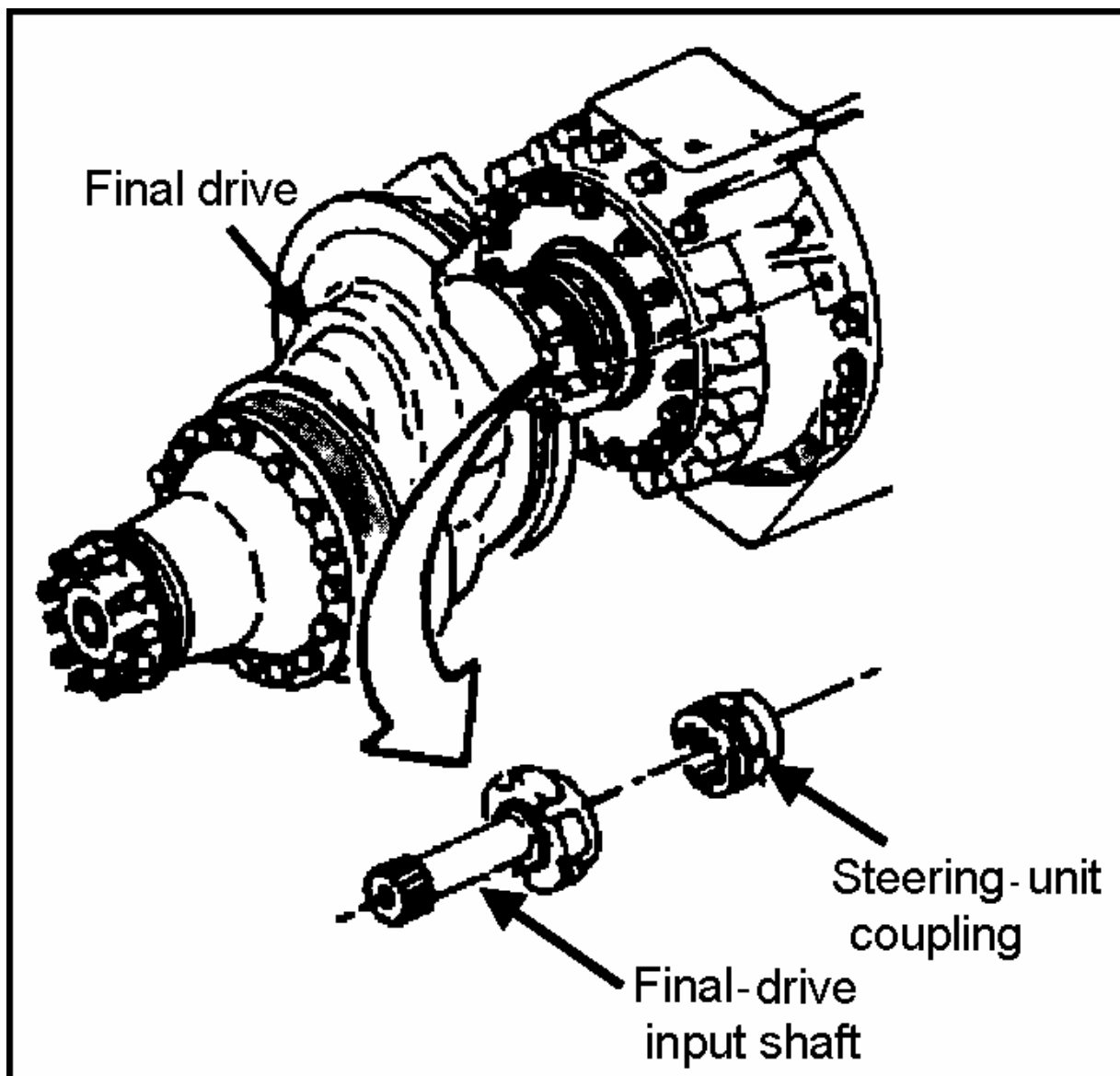


Figure 052-227-1104-4  
Disconnecting the Final Drive

NOTE: The power-train components can be damaged if the final-drive input shafts are not disconnected from the steering unit before towing.

9. Install the spacer plate in the final-drive flange to keep the input shaft from hitting the steering-unit components (Figure 052-227-1104-5).

## Performance Steps

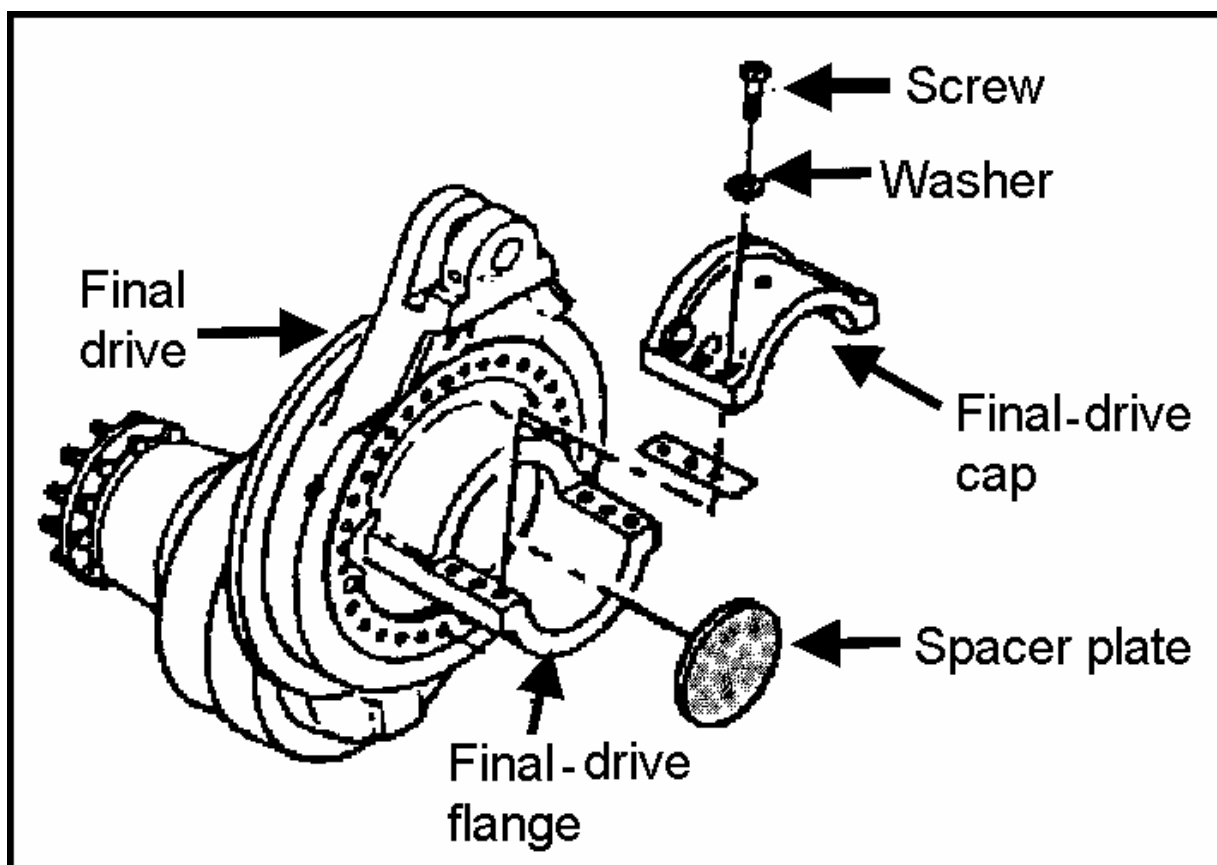


Figure 052-227-1104-5  
Installing the Spacer Plate

10. Place the final-drive cap on the final-drive flange, and install the cap with the six screws and the six washers (Figure 052-227-1104-5).
11. Connect the final-drive fill hose to the elbow and the connectors.
12. Place the four rear-floor plate braces, and install with the four screws.
13. Install the three rear-floor plates.

**Evaluation Preparation:** Set up: Provide the soldier with the items listed in the conditions. The evaluator may use an operational or a nonoperational vehicle for this task.

Brief soldier: Tell the soldier that he will be required to complete the performance measures according to the standards set forth in the task.

## Performance Measures

1. Ensured the vehicle's hand brake was engaged.
2. Removed the three rear-floor plates.
3. Disconnected the final-drive fill hose from the connector and the elbow.

GO    NO GO

—    —  
—    —  
—    —

**Performance Measures**

	<b><u>GO</u></b>	<b><u>NO GO</u></b>
4. Removed the four screws and the four rear-floor plate braces.	—	—
5. Removed the six screws, the six washers, and the final-drive cap from the final-drive flange.	—	—
6. Used a screwdriver to pry loose the tabs on the nut.	—	—
7. Used the spanner wrench to loosen the nut, and slid the nut toward the final drive.	—	—
8. Separated the final-drive input shaft from the steering-unit coupling.	—	—
9. Installed the spacer plate in the final-drive flange.	—	—
10. Placed the final-drive cap on the final-drive flange, and installed the six screws and the six washers.	—	—
11. Connected the final-drive fill hose to the elbow and the connectors.	—	—
12. Placed the four rear-floor plate braces and installed them with the four screws.	—	—
13. Installed the three rear-floor plates.	—	—

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

**References****Required****Related**

TM 5-2350-262-10

## Subject Area 5: Basic Rigging

**Tie Knots**  
**052-200-1075**

**Conditions:** As a combat engineer in a field environment, given lengths of fiber rope up to 1 inch in diameter (including at least one rope of a different diameter) and wooden poles of various sizes.

**Standards:** Tie each knot so it performs the designed function without failure.

**Performance Steps**

1. Tie a square knot. Use the square knot to tie together two dry ropes of the same thickness. Make the first crossing left over right or right over left. Tie the second crossing opposite the first (Figure 052-200-1075-1).

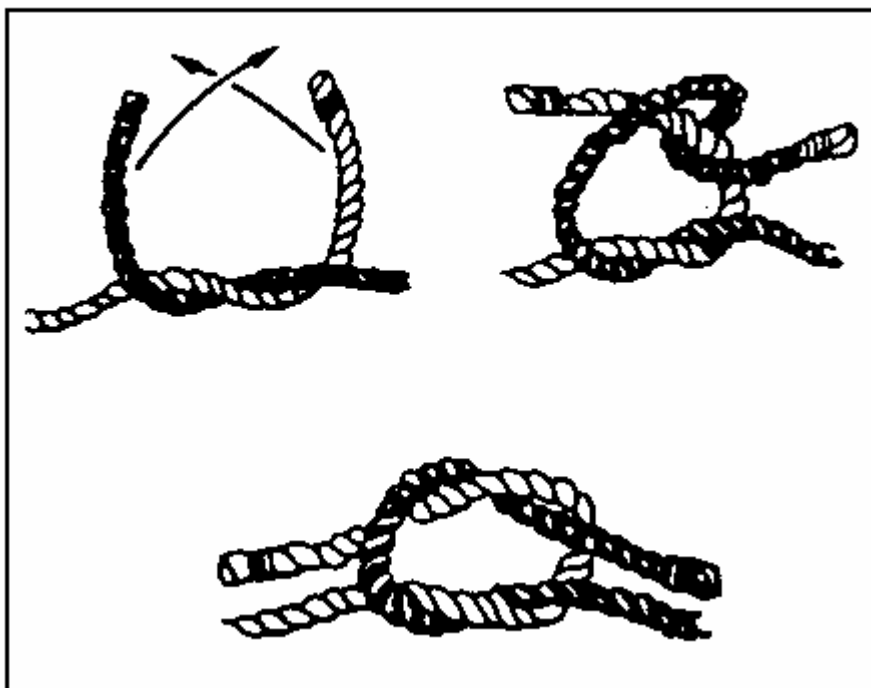


Figure 052-200-1075-1  
Tying a Square Knot

2. Tie a bowline. Use the bowline for forming a nonslipping loop (Figure 052-200-1075-2).

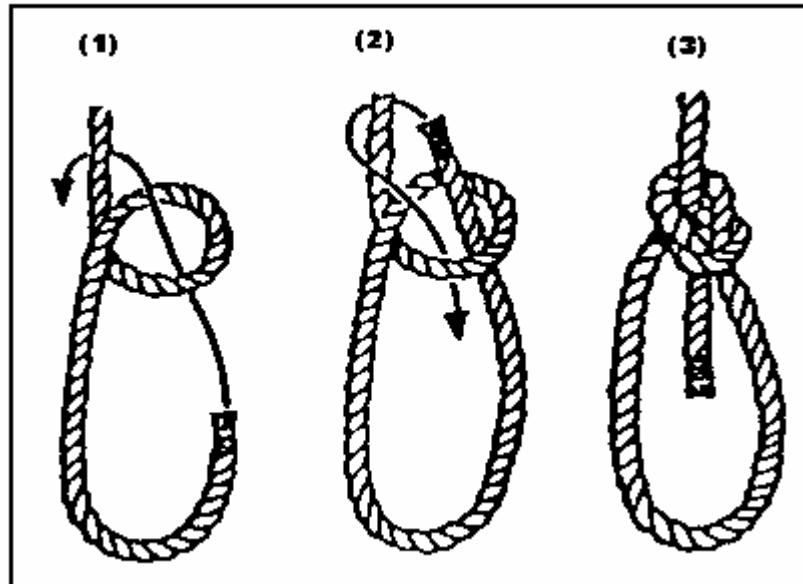
**Performance Steps**

Figure 052-200-1075-2  
Tying a Bowline

3. Tie a clove hitch. Use the clove hitch to fasten a rope to a timber, pipe, or post. The clove hitch is also used for making other knots (Figure 052-200-1075-3).

## Performance Steps

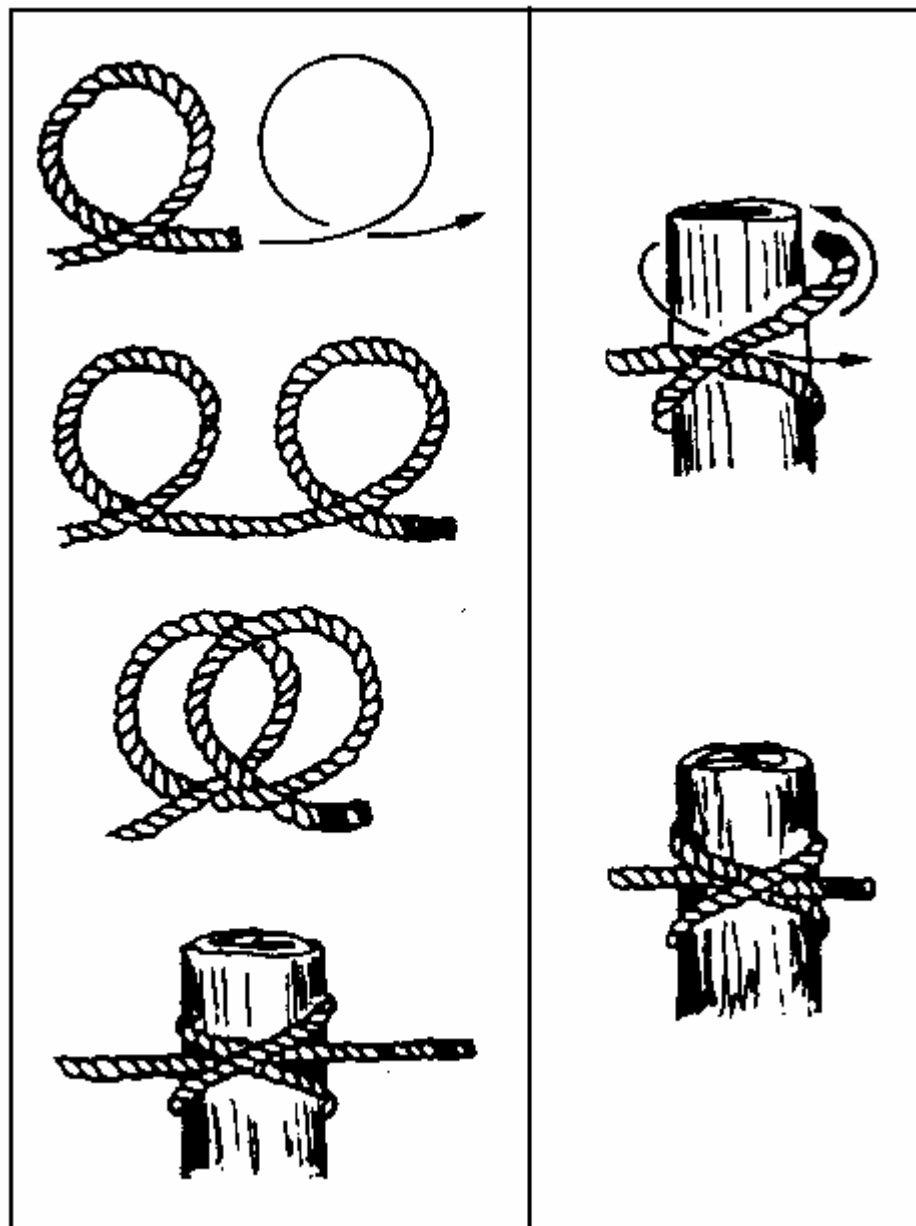


Figure 052-200-1075-3  
Tying a Clove Hitch

4. Tie a girth hitch. Use a girth hitch on rope bridges (Figure 052-200-1075-4).

Performance Steps

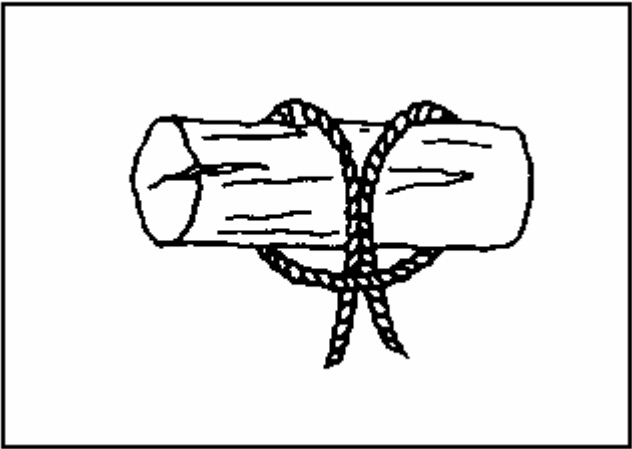


Figure 052-200-1075-4  
Tying a Girth Hitch

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions statement.

Brief soldier: Tell the soldier what is expected.

Performance Measures	<u>GO</u>	<u>NO GO</u>
1. Tied a square knot.	—	—
2. Tied a bowline.	—	—
3. Tied a clove hitch.	—	—
4. Tied a girth hitch.	—	—

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

**References**  
**Required**

**Related**  
FM 5-125

**Unfold the Blade of an Armored Combat Earthmover (ACE), M9**  
**052-227-1110**

**Conditions:** As an ACE operator in a field environment, given an ACE with an empty bowl and a folded blade; a completed before-operation preventive-maintenance checks and services (PMCS); basic-issue items (BIs); and an assistant.

**Standards:** Unfold the ACE's blade without causing injury to personnel or equipment damage.

**Performance Steps**

1. Start the ACE's engine and allow it to warm-up for 3 to 5 minutes.
2. Place the suspension control lever in the SPRUNG position (Figure 052-227-1110-1).

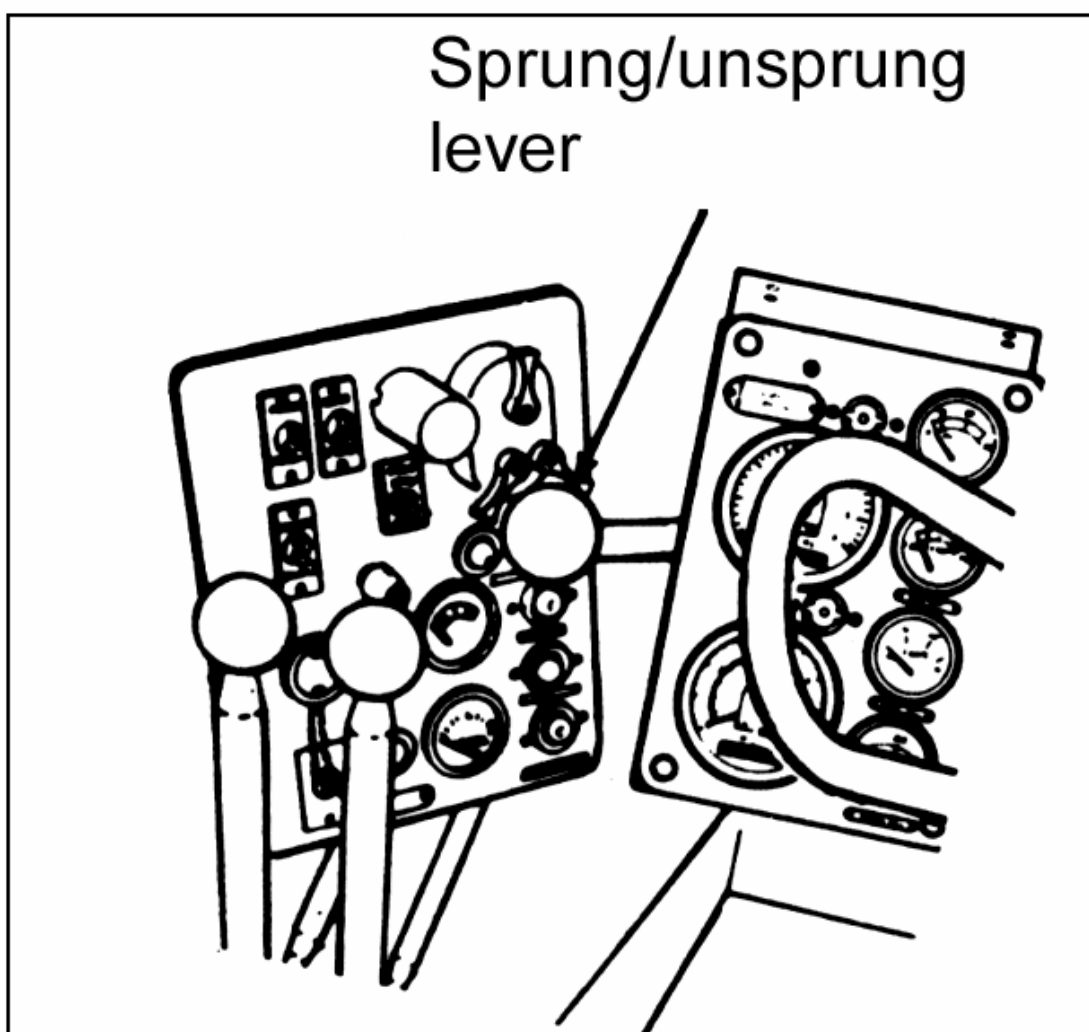


Figure 052-227-1110-1  
Suspension Control Levers

3. Move the ejector stop away from the ejector control lever. Move the ejector forward 2 feet or until the assistant signals you to stop (Figure 052-227-1110-2).



## Performance Steps

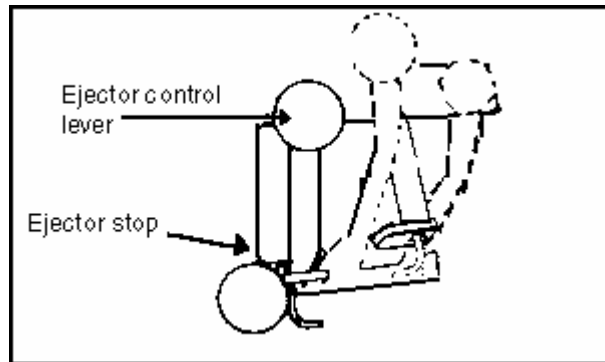


Figure 052-227-1110-2  
Ejector Control Lever

**WARNING:** DO NOT OPERATE THE EJECTOR WITH PERSONNEL IN THE BOWL, UNLESS THE EJECTOR LOCK IS ENGAGED. FAILURE TO FOLLOW THE PROPER PROCEDURES MAY RESULT IN SEVERE INJURY TO PERSONNEL.

**WARNING:** DO NOT WORK UNDER THE VEHICLE UNLESS THE HULL IS BLOCKED AND THE APRON LOCK PINS ARE INSTALLED. FAILURE TO FOLLOW THE PROPER PROCEDURES MAY RESULT IN SEVERE INJURY TO PERSONNEL.

4. Remove the shovel and the chain from the apron stowage.
5. Instruct the assistant to help complete the following tasks to unfold the ACE's blade:
  - a. Attach the chain to the lifting eye, thread the free end of the chain through the shackle of the dozer blade, and secure the chain with the hook (Figure 052-227-1110-3).

**NOTE:** The loop in the chain should consist of approximately 10 links.

- b. Remove the two clips. Remove the two dozer lock pins by driving them through or pulling them out. Remove the screw, the nut, and the latch from each side of the dozer blade (Figure 052-227-1110-3).

## Performance Steps

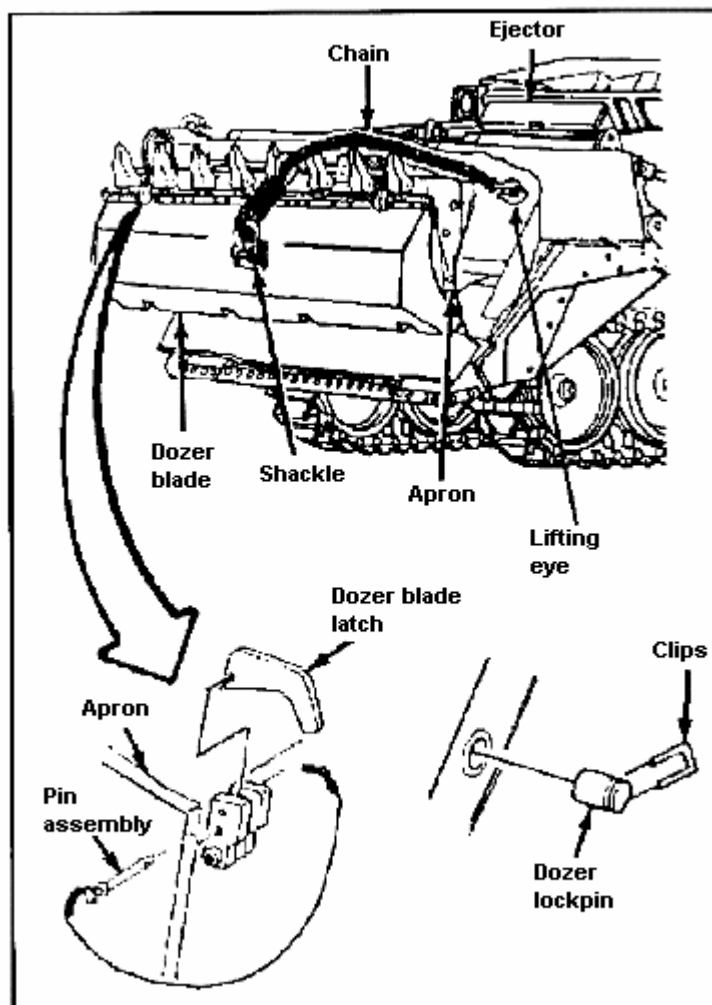


Figure 052-227-1110-3  
Unfolding the ACE'S Blade

NOTE: Due to the tension of the dozer blade against the latch, when the chain is connected, the operator may have to pull the ejector to the rear and instruct the assistant to remove the blade's latches or pins.

6. Move the ejector stop away from the control lever, and slowly move the ejector forward to lower the dozer blade to the ground.
7. Move the ejector completely forward, and engage the ejector stop.
8. Reinstall the two dozer lock pins.
9. Reinstall the latches, the screws, and the nuts on each side of the dozer blade.
10. Remove the chain from the ejector, and place it in front of the vehicle.
11. Use the apron control lever to raise the apron to the full open position (Figure 052-227-1110-4)

## Performance Steps

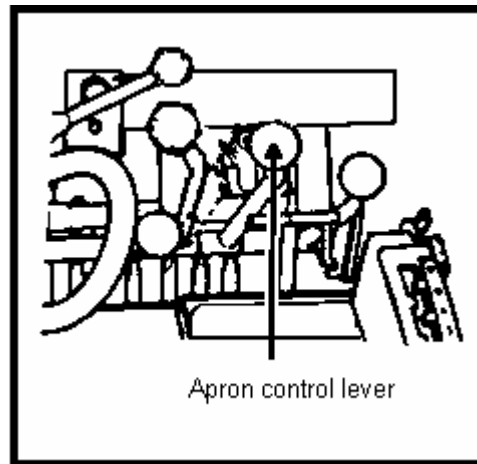


Figure 052-227-1110-4  
Apron Control Lever

12. Install the apron lock pins (Figure 052-227-1110-5).

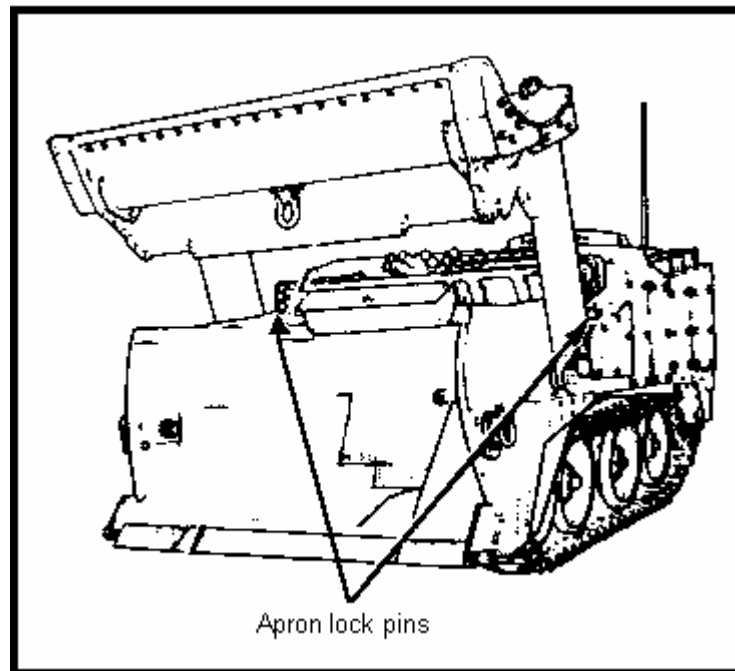


Figure 052-227-1110-5  
Apron Lock Pins

13. Remove the chain from the dozer blade.
14. Remove the apron lock pins, and lower the apron.
15. Retract the ejector.

## Performance Steps

16. Stow the shovel and the chain in the apron stowage.

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions.

Brief soldier: The assistant is only to assist the soldier when instructed to do so and can only perform the steps covered in the training information outline.

<b>Performance Measures</b>	<b><u>GO</u></b>	<b><u>NO GO</u></b>
1. Started the ACE's engine and allowed it to warm-up for 3 to 5 minutes.	—	—
2. Placed the suspension control lever in the SPRUNG position.	—	—
3. Moved the ejector forward 2 feet or until the assistant signaled to stop.	—	—
4. Removed the shovel and the chain from the apron stowage.	—	—
5. Attached the chain to the lifting eye, threaded the free end of the chain through the shackle of the dozer blade, and secured the chain with the hook.	—	—
6. Removed the clips, the dozer lock pins, the screws, the nuts, and the blade's latches.	—	—
7. Moved the ejector completely forward and engaged the ejector stop.	—	—
8. Moved the ejector forward to lower the dozer blade to the ground.	—	—
9. Reinstalled the two dozer lock pins, the latches, the screws, and the nuts on each side of the dozer blade.	—	—
10. Removed the chain from the ejector and placed it in front of the vehicle.	—	—
11. Raised the apron and installed the apron lock pins.	—	—
12. Removed the chain from the dozer blade.	—	—
13. Removed the apron lock pins, lowered the apron, retracted the ejector, and stowed the chain and shovel.	—	—

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

## References

### Required

### Related

TM 5-2350-262-10

## Subject Area 6: Basic Vehicle Operations

**Drive an Armored-Vehicle-Launched Bridge (AVLB)****052-225-1213**

**Conditions:** As an AVLB operator in a field environment, given an AVLB (an M48 or M60 tank chassis) with a completed before-operation preventive-maintenance checks and services (PMCS) and a location with a suitable driving area consisting of varied terrain and obstacles.

**Standards:** Operate the AVLB using the appropriate driving techniques. Maintain the vehicle at all times, and avoid injury to personnel and equipment damage.

**Performance Steps**

1. Refer to Table 052-225-1231-1 and select a gear that will maintain the momentum of the AVLB.

<b>Gear</b>	<b>Minimum Speed</b>	<b>Maximum Speed</b>	<b>Ground Characteristics</b>
Low	0 mph	10 mph	Mud, snow, deep sand, and steep grades
High	10 mph	30 mph	Semihard or hard surface, moderate slopes, and rolling terrain
Reverse	0 mph	5 mph	As needed

Table 052-225-1213-1  
Gear Speed

2. Drive the AVLB over various terrain conditions. Drive--
  - a. In the mud using a low-range gear. Move steadily through the mud. Avoid digging in. Maintain sufficient speed to keep the vehicle from stalling. When the area is level, accelerate and allow the momentum of the vehicle to carry it through. Avoid slippery inclines. If a slippery incline is unavoidable, ascend and descend slowly and steadily. When the traction on the track is broken, do not allow the vehicle to become mired down or dug in.
  - b. On heavily-crusts snow. The vehicle may experience occasional breakthroughs. To climb back onto the crust, reduce the engine speed, and move the transmission shift lever to low to achieve a very low forward-movement track speed without slippage. Avoid steep grades. Drive the vehicle, as straight as possible, up and down the grade to equalize the track load. Avoid sharp turns, ruts, and snow banks. In soft or fine snow, drive with the transmission shift lever in low.
  - c. On the ice. Select a speed and a range, which allows the vehicle to move slowly and steadily. If skidding occurs, decelerate the engine, and proceed with caution.
  - d. In the sand. Select a gear, which allows the vehicle to maintain its forward momentum without spinning its tracks. Select the appropriate gear before entering a sandy location. Shake sand from the vehicle using the steering controls or by backing up and throwing off any sand buildup between the rear drive sprockets and the tracks. Sand buildup causes a lack of steering response and could throw a track.

NOTE: Avoid sandy locations, as they cause severe track wear.

- e. In a rocky location. Keep the vehicle speed at a minimum in order to reduce the impact of the track with the ground. At slower speeds, rocks that are picked up by the track will not be thrown into the suspension system.

NOTE: Avoid rocky locations, as they cut rubber from the track blocks and the road wheels. Rocks can bend or break the center guides or throw a track.

- f. In marshy terrain. Follow a straight and steady course. Maintain the vehicle's momentum and avoid spinning the tracks.

### Performance Steps

NOTE: Avoid marshy areas and thawed or thawing arctic tundra, as these areas cause the vehicle to bog down. Do not try to move a mired AVLB without assistance. Spinning the tracks will only dig the vehicle in deeper.

3. Drive the AVLB over a steep obstacle (Figure 052-225-1213-1).

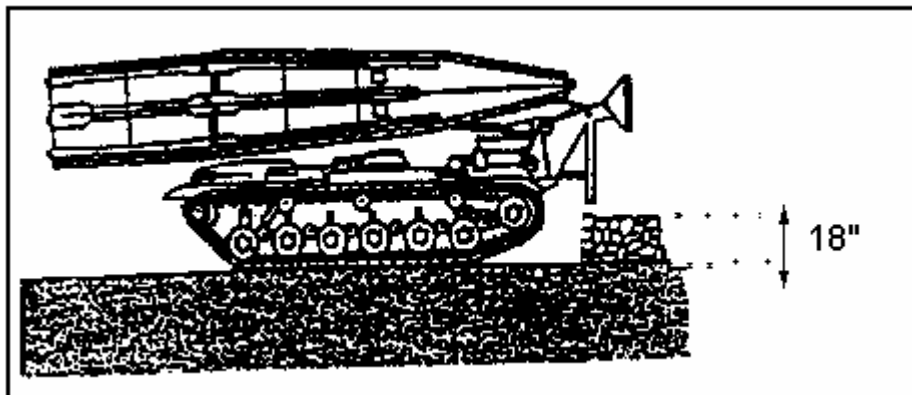


Figure 052-225-1213-1  
Driving over a Steep Obstacle

WARNING: WHEN DRIVING OVER AN OBSTRUCTION, ADJUST THE SPEED AND DIRECTION SO THAT THE VEHICLE MEETS THE OBSTRUCTION AS SQUARELY AS POSSIBLE. THE OPERATOR SHOULD WARN THE OTHER CREW MEMBER TO BRACE HIMSELF. THE HATCHES SHOULD BE LOCKED IN POSITION. THE AVLB CAN CLIMB AN OBSTRUCTION UP TO 18 INCHES (44.35 CENTIMETERS) HIGH. DO NOT OPERATE AN AVLB IN REVERSE WHEN CLIMBING AN OBSTACLE.

- a. Approach the obstruction, release the accelerator pedal, apply the brakes, and shift into low gear.
- b. Begin across the obstruction, and apply full power. Release the accelerator pedal when the vehicle reaches the crest. Allow the vehicle to settle over the crest. (Balance should be such that the vehicle is on the descending side of the obstruction.)
- c. Allow the front of the tracks to make contact with the ground, apply the power, and descend the obstacle.

CAUTION: BE CAREFUL NOT TO DAMAGE THE REAR FENDERS WHEN DESCENDING OR PULLING AWAY FROM AN OBSTACLE. DO NOT BACK THE AVLB OVER AN OBSTACLE.

4. Drive the AVLB up a steep grade (Figure 052-225-1213-2).

## Performance Steps

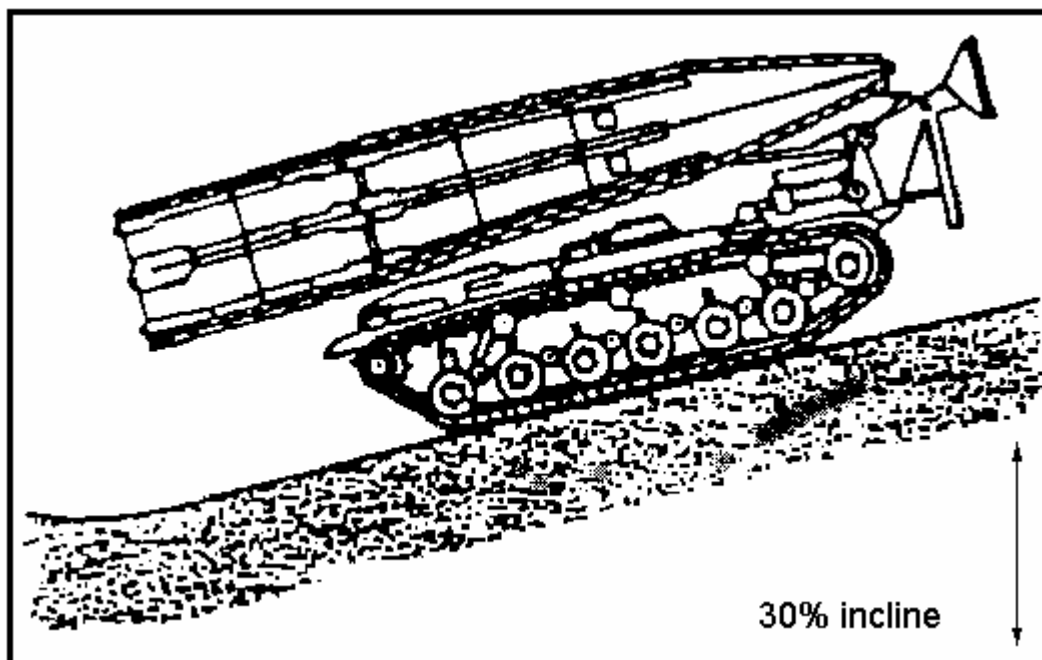


Figure 052-225-1213-2  
Driving up a Steep Grade

CAUTION: DO NOT DRIVE THE AVLB UP A GRADE STEEPER THAN 30 PERCENT. ENSURE THAT ALL OF THE HATCHES ARE LOCKED IN POSITION. DO NOT ATTEMPT TO HOLD THE VEHICLE STATIONARY ON AN INCLINE USING THE ACCELERATOR PEDAL, AS THE TRANSMISSION WILL OVERHEAT. DEPRESS THE BRAKE PEDAL AND APPLY THE PARKING BRAKE.

- a. Shift the transmission to low, and accelerate up the grade.
- b. Stop the vehicle on the incline.
- c. Continue up the incline. To keep the vehicle from rolling backward, depress and hold the brake pedal, shift the transmission lever from park to low gear, accelerate the engine, and release the brake.

CAUTION: IF THE ENGINE STALLS, DO NOT ALLOW THE VEHICLE TO ROLL BACKWARD WITH THE TRANSMISSION SHIFT LEVER IN DRIVE. SERIOUS DAMAGE TO THE ENGINE OR THE AIR CLEANER MAY RESULT, AND THE CREW COMPARTMENT MAY FILL WITH SMOKE. THE TRANSMISSION WILL CAUSE THE ENGINE TO RUN IN REVERSE ROTATION. IF THIS HAPPENS, STOP THE VEHICLE, AND SHUT DOWN THE ENGINE. RESTART THE ENGINE. IF THE BRAKE DOES NOT STOP THE MOVING VEHICLE, SHIFT THE TRANSMISSION LEVER TO NEUTRAL.

5. Drive the AVLB down a steep grade (Figure 052-225-1213-3).

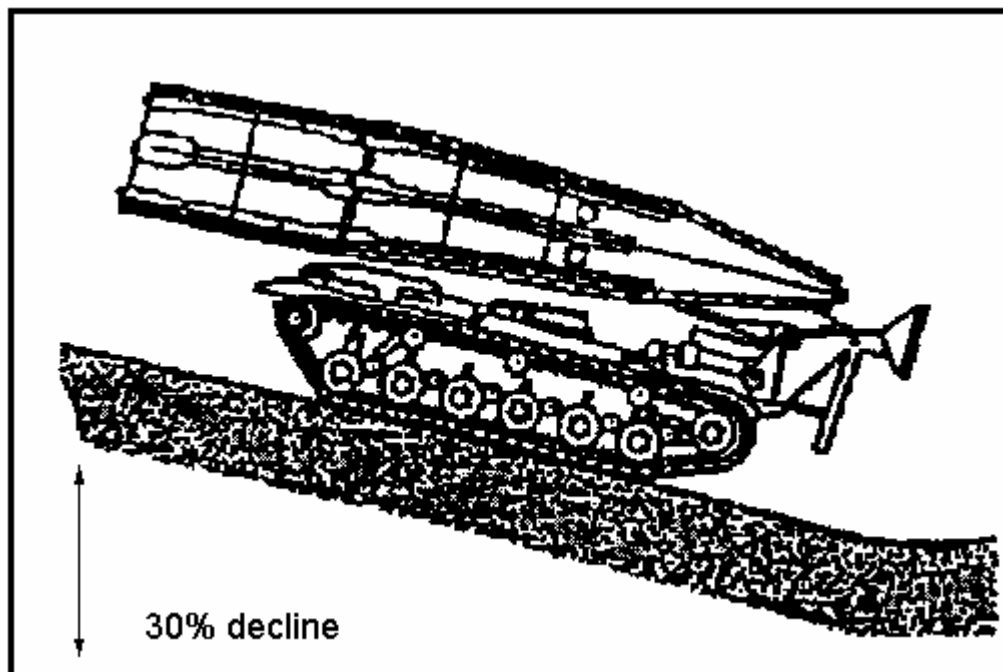
**Performance Steps**

Figure 052-225-1213-3  
Driving Down a Steep Grade

**WARNING: DO NOT DRIVE THE AVLB DOWN A GRADE STEEPER THAN 30 PERCENT.**

6. Drive the AVLB on a side slope (Figure 052-225-1213-4). When driving on a side slope, the vehicle will tend to drift downhill sideways. Make smooth steering corrections to prevent drifting.



## Performance Steps

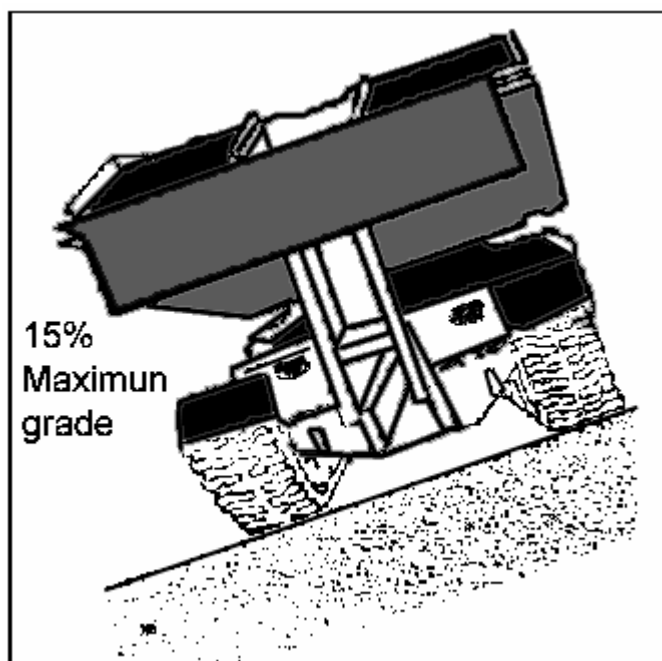


Figure 052-225-1213-4  
Driving on a Side Slope

**CAUTION:** DO NOT TURN QUICKLY WHEN DRIVING ON A SIDE SLOPES, AS IT COULD CAUSE THE VEHICLE TO OVERTURN OR THROW A TRACK. THE MAXIMUM GRADE FOR AN AVL B SIDE-SLOPE OPERATION IS 15 PERCENT.

- a. Shift the transmission lever to low gear, and maintain the engine speed below 2,400 revolutions per minute (rpm). Apply the brakes as needed.
- b. Stop the vehicle and shift the transmission shift lever to reverse before descending an extremely long and very steep side slope. An increased braking effect may be obtained by accelerating the engine.

**WARNING:** THE STEERING IS REVERSED WHEN OPERATING THE AVL B IN A FORWARD DIRECTION WHILE IN REVERSE RANGE. USING REVERSE AS A BRAKE SHOULD BE AVOIDED AND SHOULD BE USED ONLY IN AN EMERGENCY SITUATION OR WHEN MANEUVERING OVER AN EXTREMELY LONG AND VERY STEEP GRADE.

- c. Move the transmission shift lever to the desired red range upon reaching the bottom of an average-grade decent. The low range will normally slow the vehicle; therefore, use of the brake pedal is not necessary.

**CAUTION:** WHEN PROCEEDING DOWN A STEEP GRADE WITH THE TRANSMISSION IN REVERSE, DO NOT ALLOW THE ENGINE TO STALL OR THE VEHICLE TO ROLL FORWARD. IF THE ENGINE STALLS, APPLY THE BRAKES AND ATTEMPT TO RESTART THE ENGINE. IF THE BRAKES DO NOT STOP THE VEHICLE, SHIFT THE TRANSMISSION TO NEUTRAL.

7. Drive the AVL B across a ditch (Figure 052-225-1213-5).

## Performance Steps

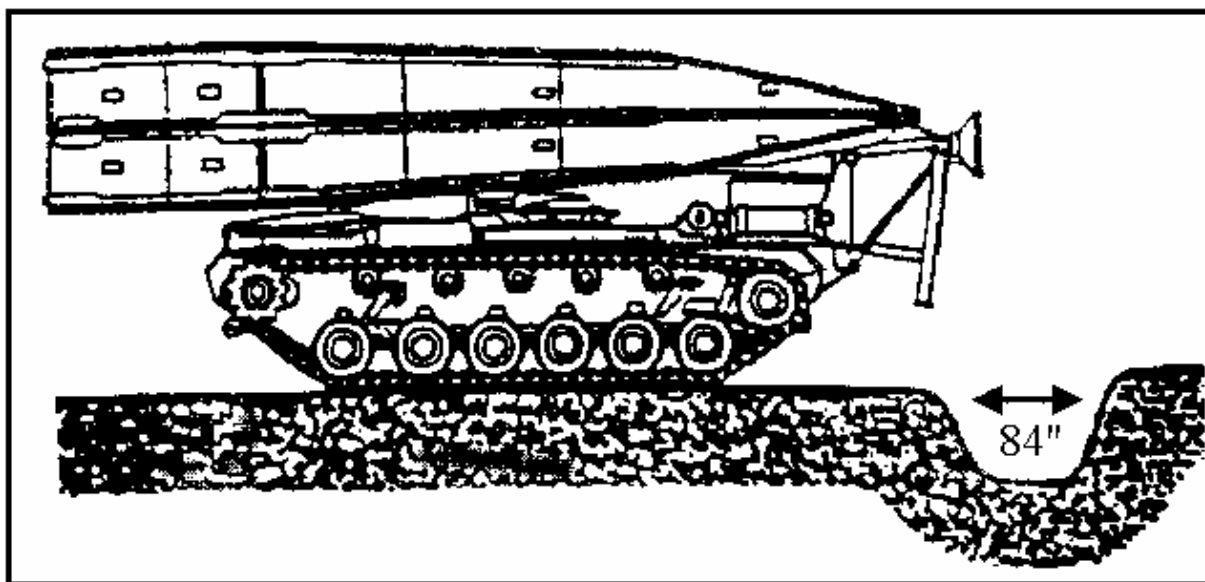


Figure 052-225-1213-5  
Driving Across a Ditch

CAUTION: AVOID CROSSING DITCHES, SHELL HOLES, OR TRENCHES THAT WOULD CAUSE THE VEHICLE'S FENDERS TO STRIKE OR DIG INTO THE GROUND. BE CAREFUL NOT TO DAMAGE THE REAR FENDERS WHEN CLIMBING OUT OF DITCHES, SHELL HOLES, OR TRENCHES. DO NOT CROSS A DITCH WIDER THAN 84 INCHES (2.13 METERS).

- a. Release the accelerator when crossing the ditch.
  - b. Apply the brakes, as necessary.
  - c. Shift the transmission to low gear.
  - d. Accelerate, as necessary, especially when climbing out of a ditch.
8. Drive the AVLB under unusual weather conditions.
  - a. Observe a vehicle shutdown period during extremely cold weather. Drive slowly for about 100 meters to warm-up the lubricants and prevent the parts from breaking.
  - b. Prevent engine overheating during extremely hot weather by avoiding the continuous use of the low or the reverse gears at high engine speeds.
9. Drive the AVLB at night or during periods of poor visibility.
  - a. Place the service lights on low beam when driving in the rain, the fog, or the snow.
  - b. Use the blackout lights.
    - (1) Remain in the darkness for one-half hour.
    - (2) Adjust the distance by using the blackout-marker lights on the vehicle in front.
      - (a) If one light spot in each taillight is visible, the vehicles are too far apart.
      - (b) If two light spots in each taillight are visible, the vehicles are the proper distance apart.
      - (c) If four light spots in each taillight are visible, the vehicles are too close together.
      - (d) If the right taillight becomes brighter or if three to five spots appear in the taillight of the vehicle ahead, the forward vehicle has stopped.
  - c. Use the blackout marker. The blackout markers provide a faint light, allow for visibility of 8 to 15 meters ahead of the vehicle, and are not visible from the air.
  - d. Use the AN/VVS-2 night viewer (refer to Task 052-225-1217).
10. Ford water in the AVLB.

**Performance Steps**

**WARNING:** DETERMINE HOW DEEP THE WATER IS. DO NOT ATTEMPT TO FORD WATER DEEPER THAN 4 FEET (1.22 METERS).

- a. Prepare to ford the water.
  - (1) Check the battery filler caps to make sure they are tight.
  - (2) Close and lock both hatches.
  - (3) Ensure that the engine air-cleaner intakes are set to draw air from the crew compartment.
  - (4) Ensure that the hull drain valves are closed.
  - (5) Set the heater master switch to the OFF position.
- b. Ford the water.
  - (1) Start and warm the engine.
  - (2) Set the master-battery switch to the OFF position.
  - (3) Shift the transmission to low, and maintain a steady acceleration to prevent stalling.
  - (4) Enter the water slowly to avoid a water surge or a bow wave.
  - (5) Operate the engine at a minimum rpm of 1,000.
  - (6) Drive at a moderate speed of 3 to 4 miles per hour (mph) to avoid forming a bow wave.

Apply the brakes as necessary.

**CAUTION:** IF THE AVLB ENTERS WATER DEEPER THAN 4 FEET, DO NOT STOP THE ENGINE WHILE IT IS SUBMERGED. PROTECTION OF THE ENGINE EXHAUST SYSTEMS AGAINST THE ENTRY OF WATER IS DEPENDENT ON THE EXHAUST PRESSURE, WHICH REQUIRES THE ENGINE TO OPERATE CONTINUOUSLY. SHOULD THE ENGINE STALL WHILE IT IS SUBMERGED, DO NOT ATTEMPT TO RESTART IT. THE VEHICLE SHOULD BE TOWED OUT OF THE WATER AS SOON AS THE TACTICAL SITUATION PERMITS. IF IT BECOMES NECESSARY TO STOP FORWARD MOVEMENT OF THE VEHICLE WHILE IT IS SUBMERGED, PLACE THE TRANSMISSION SHIFT LEVER IN HIGH GEAR, APPLY AND HOLD THE BRAKES, AND DEPRESS THE ACCELERATOR AND THE ENGINE-ACCELERATOR-PEDAL LOCKING LEVER TO MAINTAIN AN ENGINE SPEED OF 1,000 rpm.

- c. Perform an after-fording PMCS according to the appropriate technical manual (TM).

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions. If the terrain conditions are not available, create a situation involving different terrain conditions, and have the soldier explain the appropriate driving methods. Obstacles and ditches may be constructed when natural terrain is not available. Any type of elevation can be used for a side slope.

**Brief soldier:** Tell the soldier that he will be required to complete the performance measures according to the standards set forth in this task.

**Performance Measures**

	<u><b>GO</b></u>	<u><b>NO GO</b></u>
1. Selected the proper gear to operate the AVLB according to the terrain conditions.	—	—
2. Drove the AVLB in the mud, the snow, the ice, the sand, the rock, and the marsh.	—	—
3. Drove the AVLB over a steep obstacle.	—	—
4. Drove the AVLB up a steep grade.	—	—
5. Drove the AVLB down a steep grade.	—	—
6. Drove the AVLB on a side slope.	—	—
7. Drove the AVLB across a ditch.	—	—
8. Drove the AVLB under unusual weather conditions.	—	—
9. Drove the AVLB at night or during periods of poor visibility.	—	—
10. Forded water in the AVLB.	—	—

**Performance Measures****GO**    **NO GO**

11. Performed an after-fording PMCS according to the appropriate TM.

\_\_\_\_\_

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

**References****Required****Related**

LO 5-5420-202-12

TC 21-306

TM 5-5420-202-10

TM 5-5420-226-10

**Start the Engine of an Armored-Vehicle-Launched Bridge (AVLB)****052-225-1214**

**Conditions:** As an AVLB operator in a field environment, given an operational AVLB (an M48 or M60 series tank) with a completed before-operation preventive-maintenance checks and services (PMCS) and a prepared operator's station. The track commander (TC) has given the order to start the engine.

**Standards:** Follow the proper procedures for starting the AVLB in normal, moderate, and cold weather conditions. Start the vehicle's engine, and check all of the gauges to ensure that the engine operates properly. Avoid injury to personnel and equipment damage.

**Performance Steps**

1. Set the parking brake.

**CAUTION:** DO NOT SET THE PARKING BRAKE WHEN THE TEMPERATURE FALLS BELOW 30 DEGREES FAHRENHEIT (F).

**NOTE:** When applying pressure to the brake, do not allow the pressure gauge to exceed 900 pounds per square inch (psi). The brake will be very difficult to release if the pressure is above 900 psi.

2. Close the drain valves in the crew and the engine compartments (Figure 052-225-1214-1).

## Performance Steps

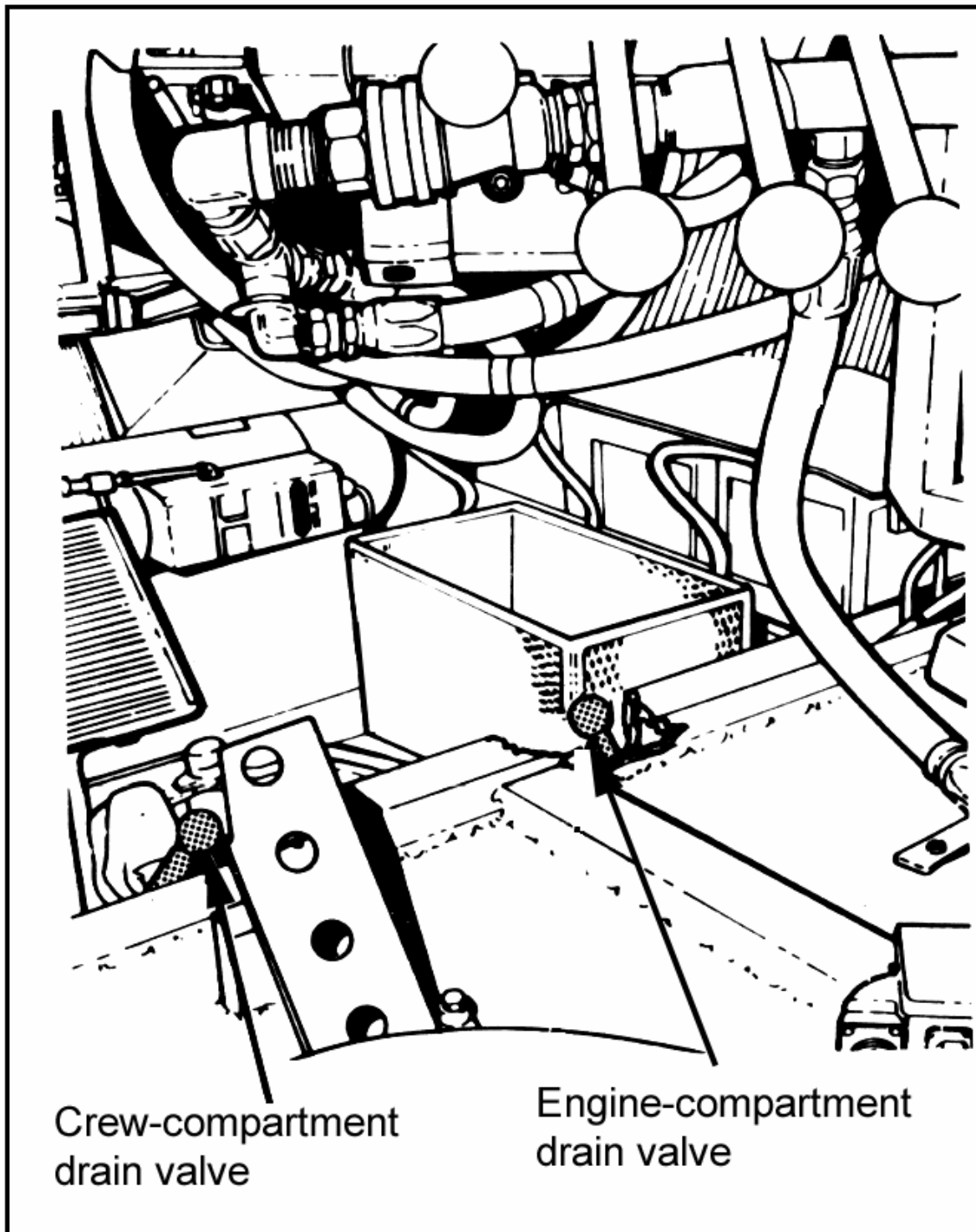


Figure 052-225-1214-1  
Drain Valves

3. Center the steering-control bar (Figure 052-225-1214-2).

**Performance Steps**

4. Ensure that the manual fuel-shutoff handle is down and locked (Figure 052-225-1214-2).

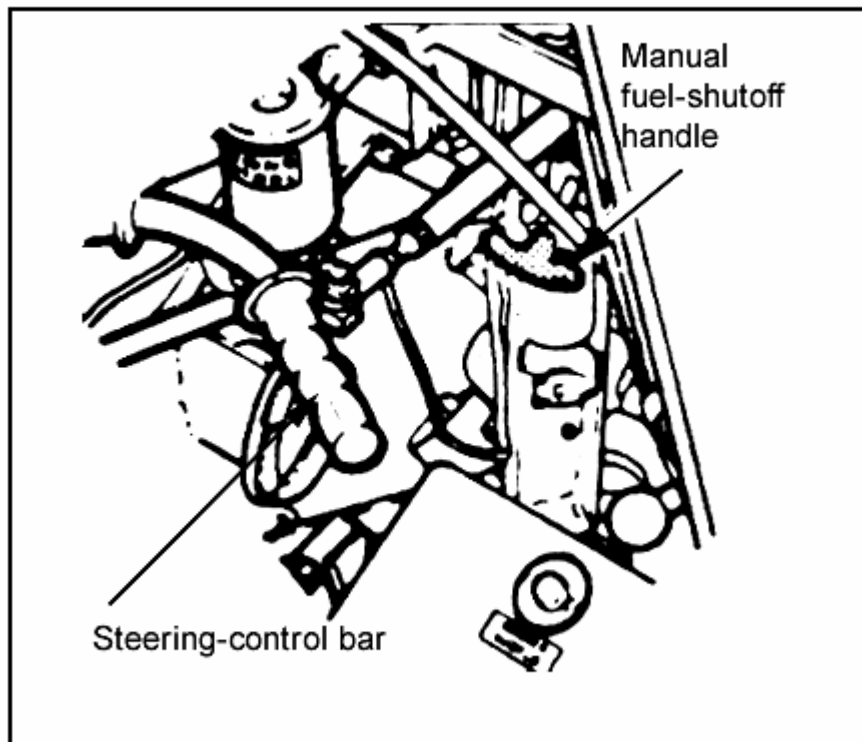


Figure 052-225-1214-2  
Manual Fuel-Shutoff Handle

5. Ensure that the master-heater and the fuel-pump switches are in the ON position. All other switches on the control panel should be in the OFF position (Figure 052-225-1214-3).

## Performance Steps

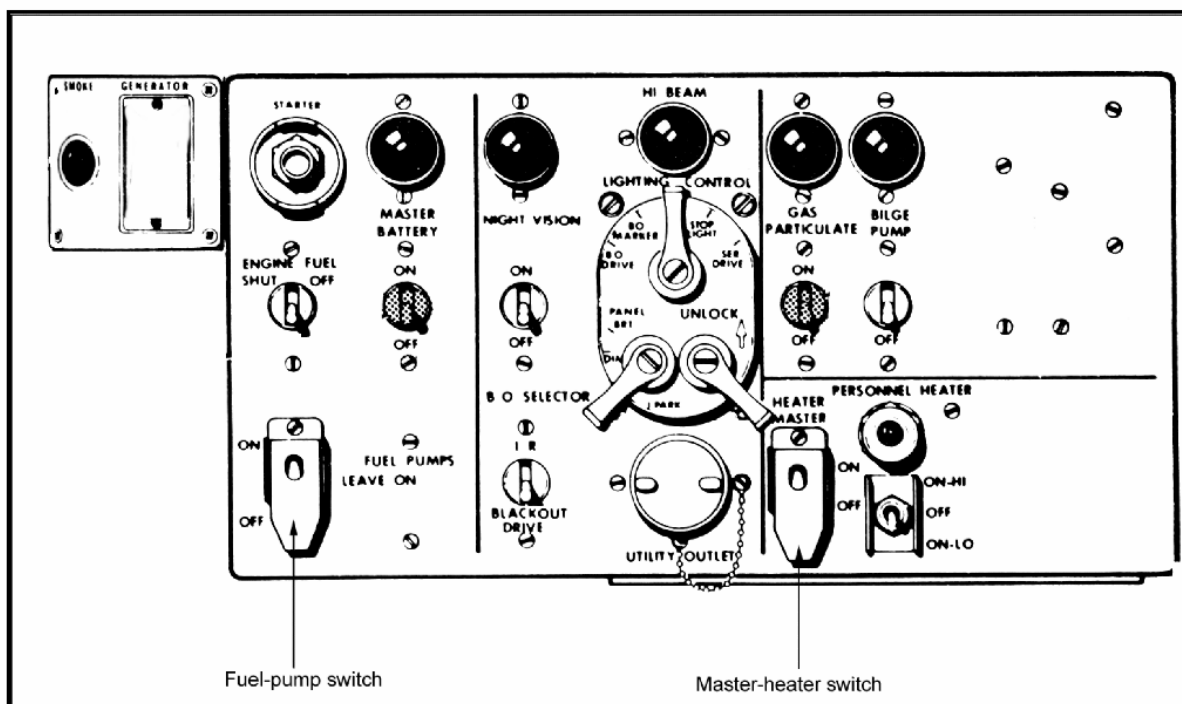


Figure 052-225-1214-3  
Master-Heater and Fuel-Pump Switches

6. Ensure that the TC turns the AM-1780 power switch to the OFF position.
7. Set the master-battery switch to the ON position (Figure 052-225-1214-4).
8. Ensure that the lights on the master-battery indicator lamp and the power-plant warning lamp are illuminated (Figure 052-225-1214-4).



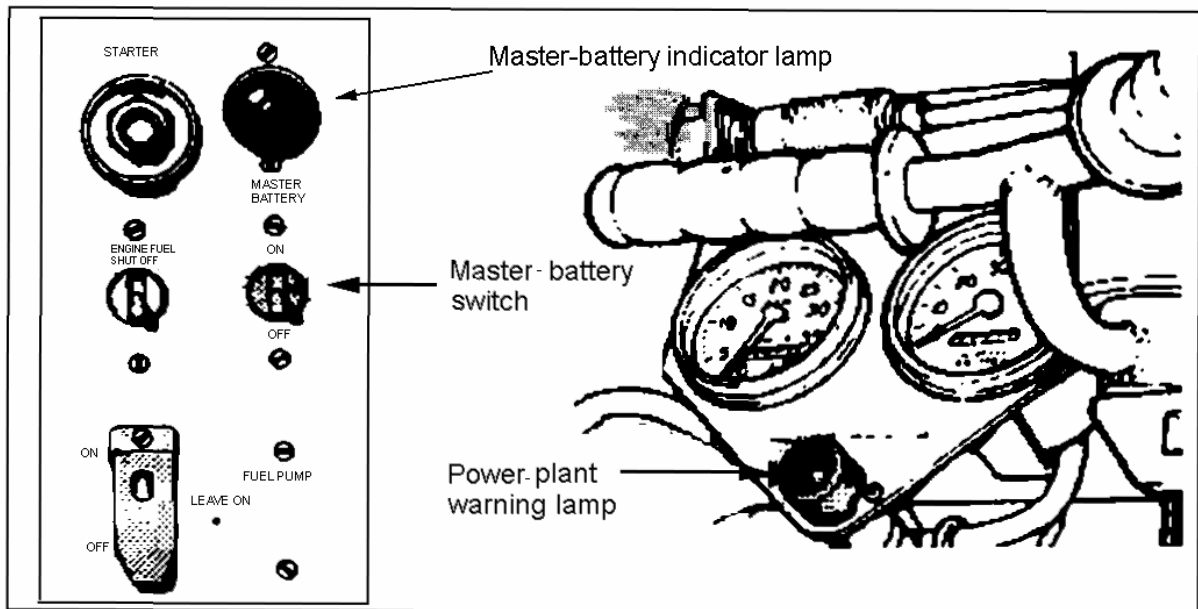
**Performance Steps**

Figure 052-225-1214-4  
Master-Battery Indicator Lamp and Power-Plant Warning Lamp

9. Check the vehicle's fuel level (Figure 052-225-1214-5).

## Performance Steps

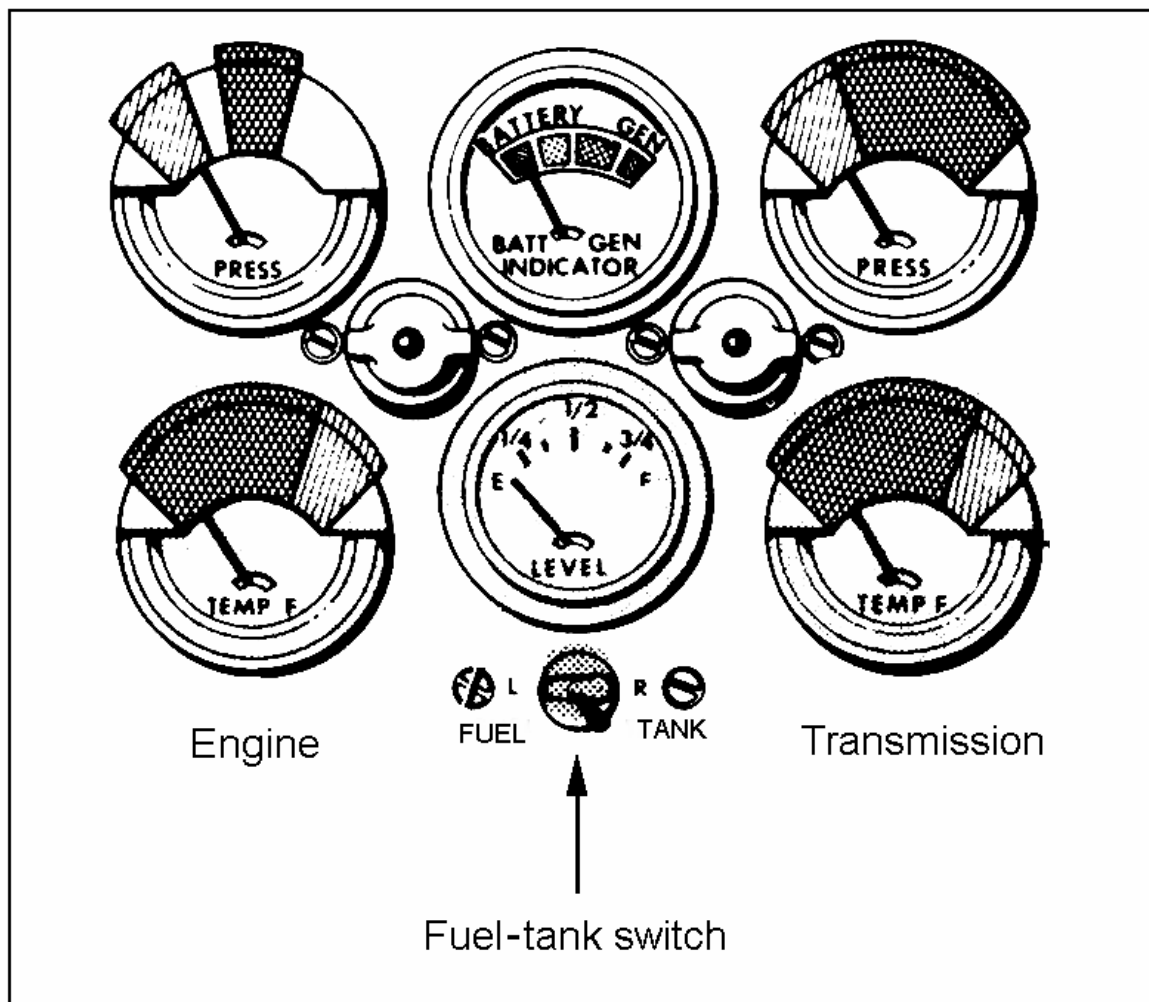


Figure 052-225-1214-5  
Fuel-Tank Switch

**WARNING:** THE NOISE LEVEL WHEN OPERATING THIS EQUIPMENT EXCEEDS THE ALLOWABLE LIMITS FOR UNPROTECTED PERSONNEL IN THE AREA. HEARING PROTECTION IS REQUIRED.

10. Start the vehicle's engine using normal- or moderate-weather starting procedures.

**CAUTION:** DO NOT PRESS AND HOLD THE STARTER BUTTON FOR MORE THAN 30 SECONDS AT A TIME AS IT COULD CAUSE DAMAGE TO THE STARTER. ALLOW 2 MINUTES OF COOL-OFF TIME BETWEEN START ATTEMPTS.

- a. Press the accelerator pedal 2/3 to 3/4 of the way to the floor, and press and hold the starter button. When the engine starts, release the starter button (Figure 052-225-1214-6). If the engine does not start on the first attempt, wait 2 minutes and attempt to start the engine again. If the engine does not start after the second try, attempt to locate the source of the problem. Continue to attempt to start the vehicle until successful.

## Performance Steps

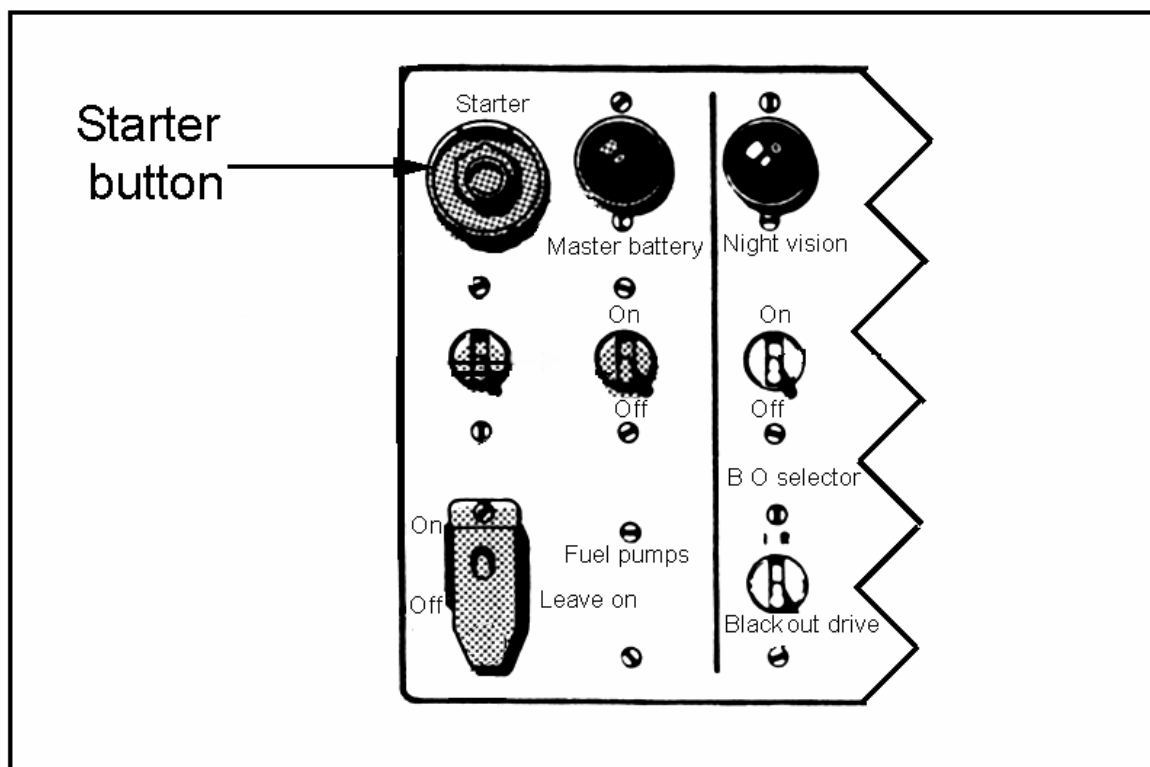


Figure 052-225-1214-6  
Engine Starter Button

- b. Ensure that the engine's oil-pressure indicator needle is in the green area and that the power-plant warning lamp goes off.
- CAUTION: DO NOT RAISE THE ENGINE IDLE ABOVE A WARM-UP IDLE (1,000 to 1,200 REVOLUTIONS PER MINUTE [RPM]) AS DAMAGE TO THE ENGINE COULD RESULT.**
- c. Press the accelerator pedal until the tachometer indicates 1,000 to 1,200 rpm (1,200 to 1,800 rpm in cold weather) (Figure 052-225-1214-7).
  - d. Pull up the accelerator lock lever (Figure 052-225-1214-7).

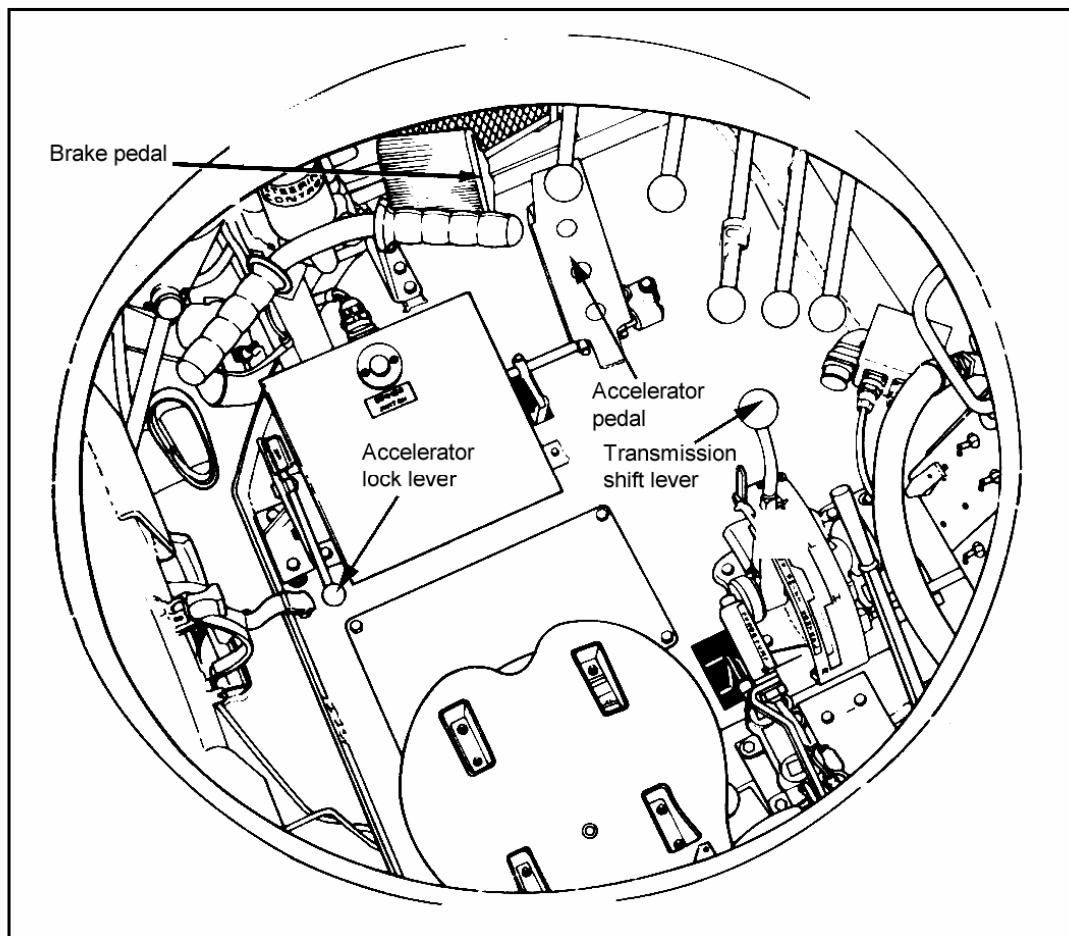
**Performance Steps**

Figure 052-225-1214-7  
View of the Operator's Compartment

- e. Allow the engine to run for 3 to 5 minutes, then release the accelerator lock lever and allow the engine to idle at a normal idle of 750 to 800 rpm.
- CAUTION: DO NOT LEAVE THE OPERATOR'S COMPARTMENT UNATTENDED WHILE THE VEHICLE'S ENGINE IS RUNNING.**
- 11. Check the gauges for proper readings. Ensure that the--
    - a. Engine oil, the battery-generator, and the transmission oil gauges show readings in the green area (Figure 052-225-1214-8).

## Performance Steps

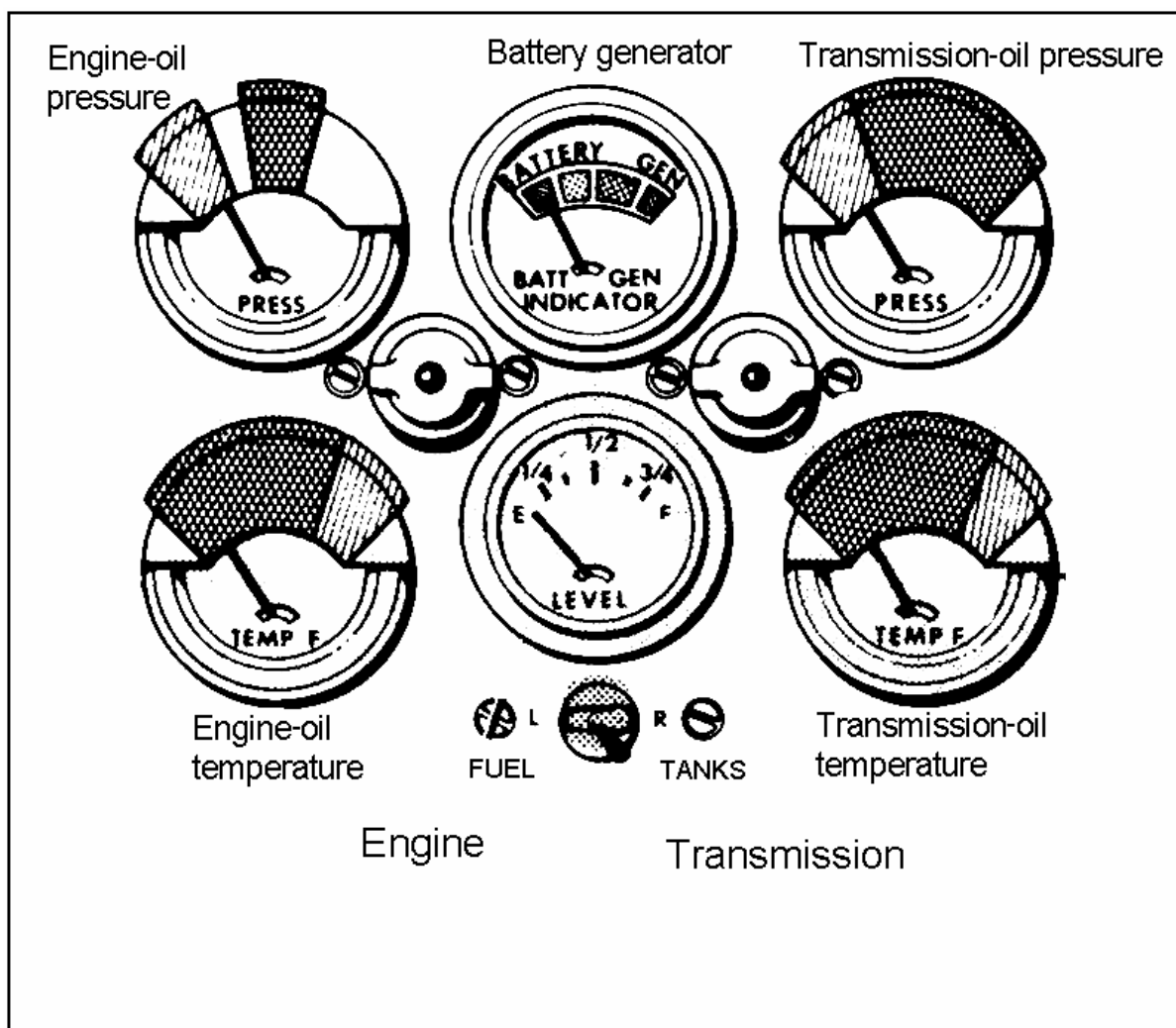


Figure 052-225-1214-8  
Gauges

- b. Power-plant warning lamp and dust-detector warning lamp (if so equipped) are in the OFF position.

**CAUTION:** DO NOT HOLD THE MANIFOLD-HEATER BUTTON FOR LONGER THAN 15 SECONDS AS IT MAY RESULT IN DAMAGE TO THE MANIFOLD HEATER.

12. Start the vehicle's engine using cold-weather starting procedures. Press the accelerator pedal 2/3 to 3/4 of the way to the floor, and press and hold the starter button. While the engine is turning, press the manifold-heater button and pump the purge-pump handle for 30 seconds (Figure 052-225-1214-9). If the engine does not start on the first attempt, release the starter button, wait 2 minutes, and attempt to start the engine. If the engine does not start after the second try, attempt to locate the source of the problem. Continue to attempt to start the vehicle until successful.

## Performance Steps

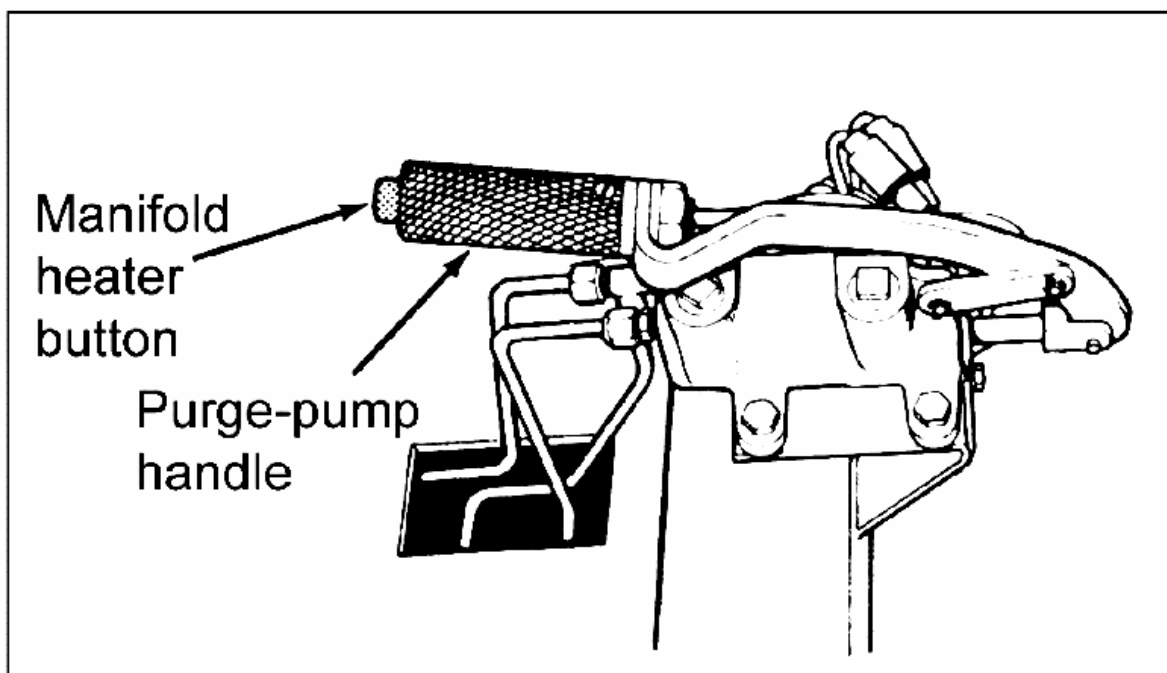


Figure 052-225-1214-9  
Manifold-Heater Button and Purge-Pump Handle

13. Check the gauges for proper readings, as shown in step 11.

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions. If the required weather conditions are not available or are too extreme, create a situation for each type of condition, and have the soldier explain the appropriate procedures for starting the vehicle.

Brief soldier: Tell the soldier that he will be required to complete the performance measures according to the standards set forth in this task.

### Performance Measures

	<u>GO</u>	<u>NO GO</u>
1. Set the parking brake.	—	—
2. Closed the drain valves in the crew and the engine compartments.	—	—
3. Centered the steering-control bar.	—	—
4. Ensured that the manual fuel-shutoff handle was down and locked.	—	—
5. Ensured that the master-heater and the fuel-pump switches were in the ON position.	—	—
6. Ensured that the TC turned the AM-1780 power switch to the OFF position.	—	—
7. Set the master-battery switch to the ON position.	—	—
8. Ensured that the lights on the master-battery indicator lamp and the power-plant warning lamps were illuminated.	—	—

**Performance Measures**

- |   | <u><b>GO</b></u> | <u><b>NO GO</b></u> |
|---|------------------|---------------------|
| 9. Checked the vehicle's fuel level.  | _____            | _____               |
| 10. Started the vehicle's engine using normal- or moderate-weather starting procedures. | _____            | _____               |
| 11. Checked the gauges for proper readings.   | _____            | _____               |
| 12. Started the vehicle's engine using cold-weather starting procedures.                | _____            | _____               |
| 13. Checked the gauges for proper readings.   | _____            | _____               |

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

**References****Required****Related**

TM 5-5420-202-10  
 TM 5-5420-203-14  
 TM 5-5420-226-10

## Extinguish a Fire on an Armored-Vehicle-Launched Bridge (AVLB)

052-225-1216

**Conditions:** As an AVLB operator in a field environment, given a moving or stationary AVLB (an M48 or M60 tank chassis). The vehicle's engine is running. There is a fire in the engine compartment, in the hull, or on the vehicle's exterior.

**Standards:** Extinguish the fire using the interior or exterior fixed fire-extinguisher control handles or the portable fire extinguisher. Avoid injury to personnel and equipment damage.

### Performance Steps

1. Stop the vehicle.

**NOTE:** The procedures in this step are for extinguishing a vehicle fire in the engine compartment using the vehicle's interior fixed fire extinguishers.

**WARNING:** DO NOT BREATHE THE SMOKE.

**WARNING:** THE CREW MUST EVACUATE THE VEHICLE AFTER THE FIRE EXTINGUISHERS ARE SET OFF.

2. Pull hard on the internal fire-extinguisher handle, and let it go (Figure 052-225-1216-1).

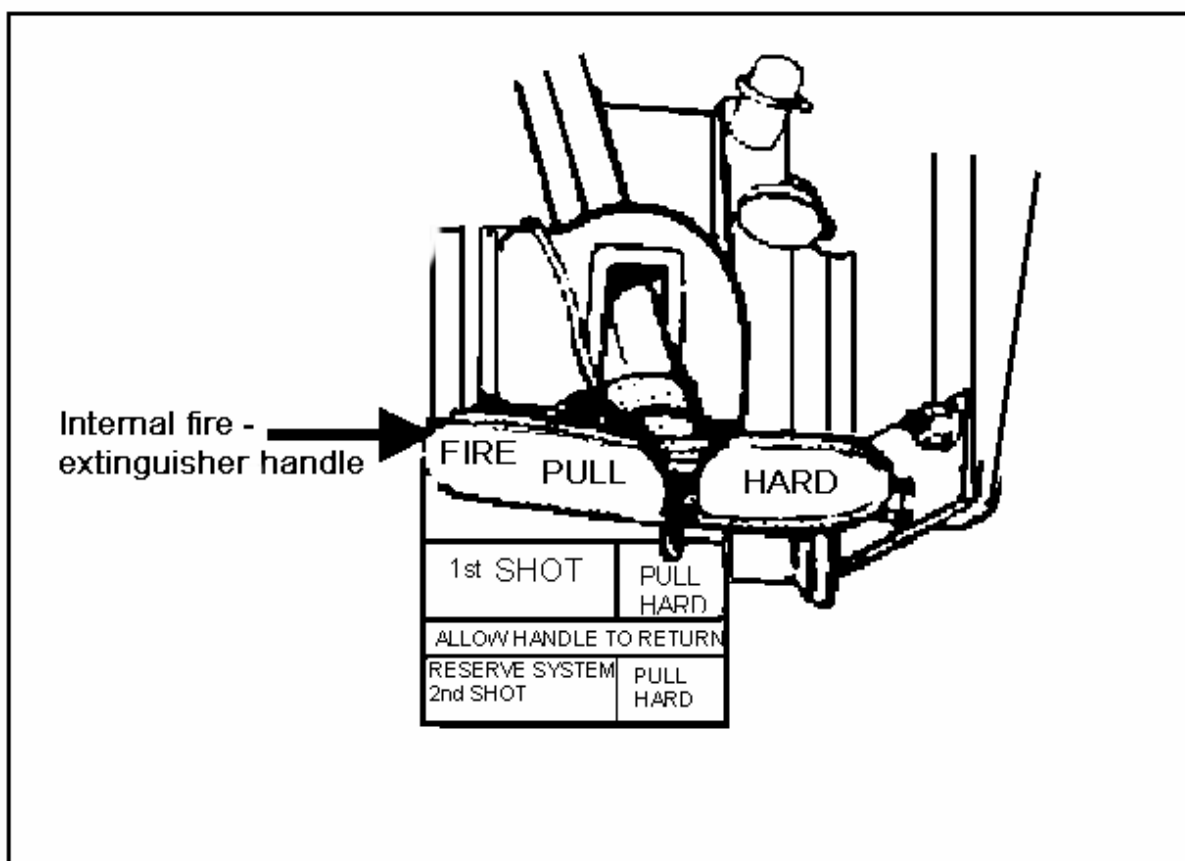


Figure 052-225-1216-1  
Internal Fire-Extinguisher Handle (1st SHOT)

**NOTE:** Pulling the fire-extinguisher handle releases the 1st SHOT and shuts off the engine's fuel. If



**Performance Steps**

the engine continues to run, pull up on the manual fuel shutoff handle.

3. Extinguish the fire. If the fire is not out within 20 seconds, release the 2nd SHOT.
  - a. Push the internal fire-extinguisher handle back in (Figure 052-225-1216-2).

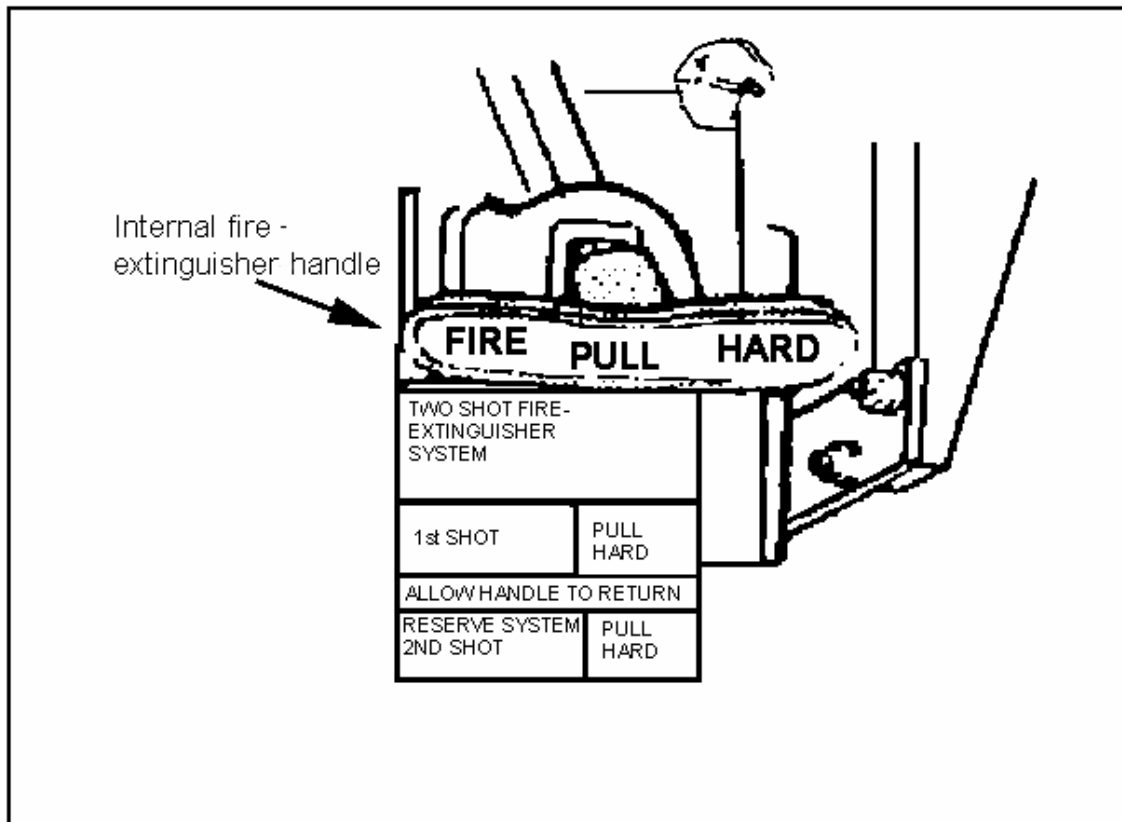


Figure 052-225-1216-2  
Internal Fire-Extinguisher Handle (2nd SHOT)

- b. Pull hard on the fire-extinguisher handle and let go.

NOTE: Resetting and pulling the handle releases the 2nd SHOT.

- c. Exit the vehicle and move upwind from it.

NOTE: Report the fire, and give the empty fire-extinguisher canisters to organizational maintenance. Do not try to restart the vehicle until the needed repairs are made and the fire extinguishers are replaced.

NOTE: If the 1st or the 2nd SHOT did not release using the interior handle, follow the procedures to extinguish a vehicle fire in the engine compartment using the exterior fixed fire-extinguisher handles.

4. Extinguish the fire by using the exterior fixed fire-extinguisher handle.
  - a. Push up and hold the engine fuel shutoff switch for 6 to 10 seconds or pull up on the manual fuel shutoff handle.
  - b. Exit the vehicle.
  - c. Proceed to the left front of the vehicle.
  - d. Pull the 1st-SHOT handle (Figure 052-225-1216-3).

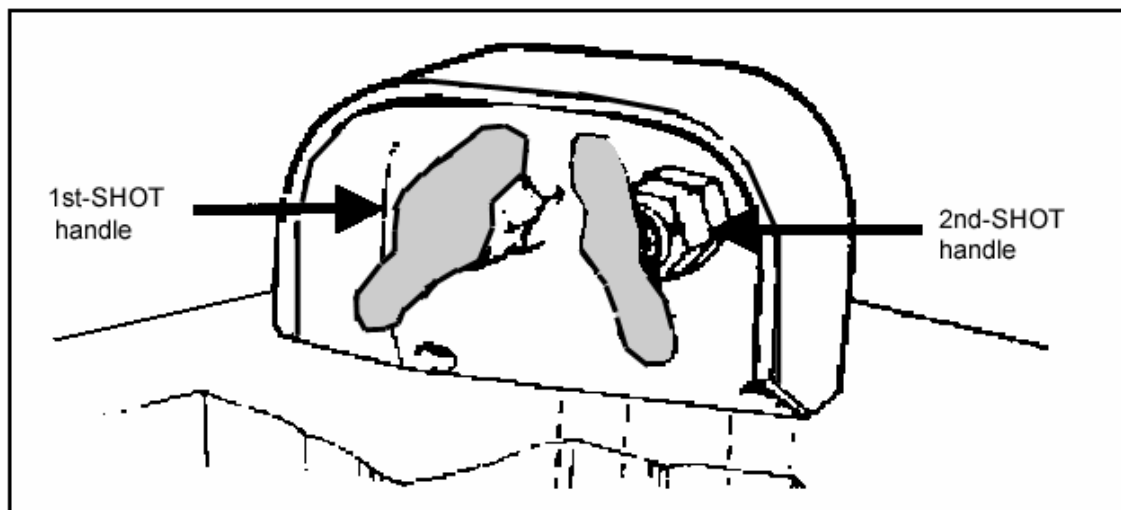
**Performance Steps**

Figure 052-225-1216-3  
External Fire-Extinguisher Handles

- e. Wait 15 to 20 seconds and pull the 2nd-SHOT handle.
- f. Move away and upwind from the vehicle.

NOTE: Report the fire, and give the empty fire-extinguisher canisters to organizational maintenance. Do not try to restart the vehicle until the needed repairs are made and the fire extinguishers are replaced.

- 5. Extinguish the interior or exterior fire by using the portable fire extinguisher.

NOTE: The portable fire extinguisher is used to extinguish smoldering or small fires such as electrical fires inside the driver's compartment or fires outside of the vehicle caused by larger blazes.

- a. Remove the portable fire extinguisher from the bracket behind the operator's seat (Figure 052-225-1216-4).

## Performance Steps

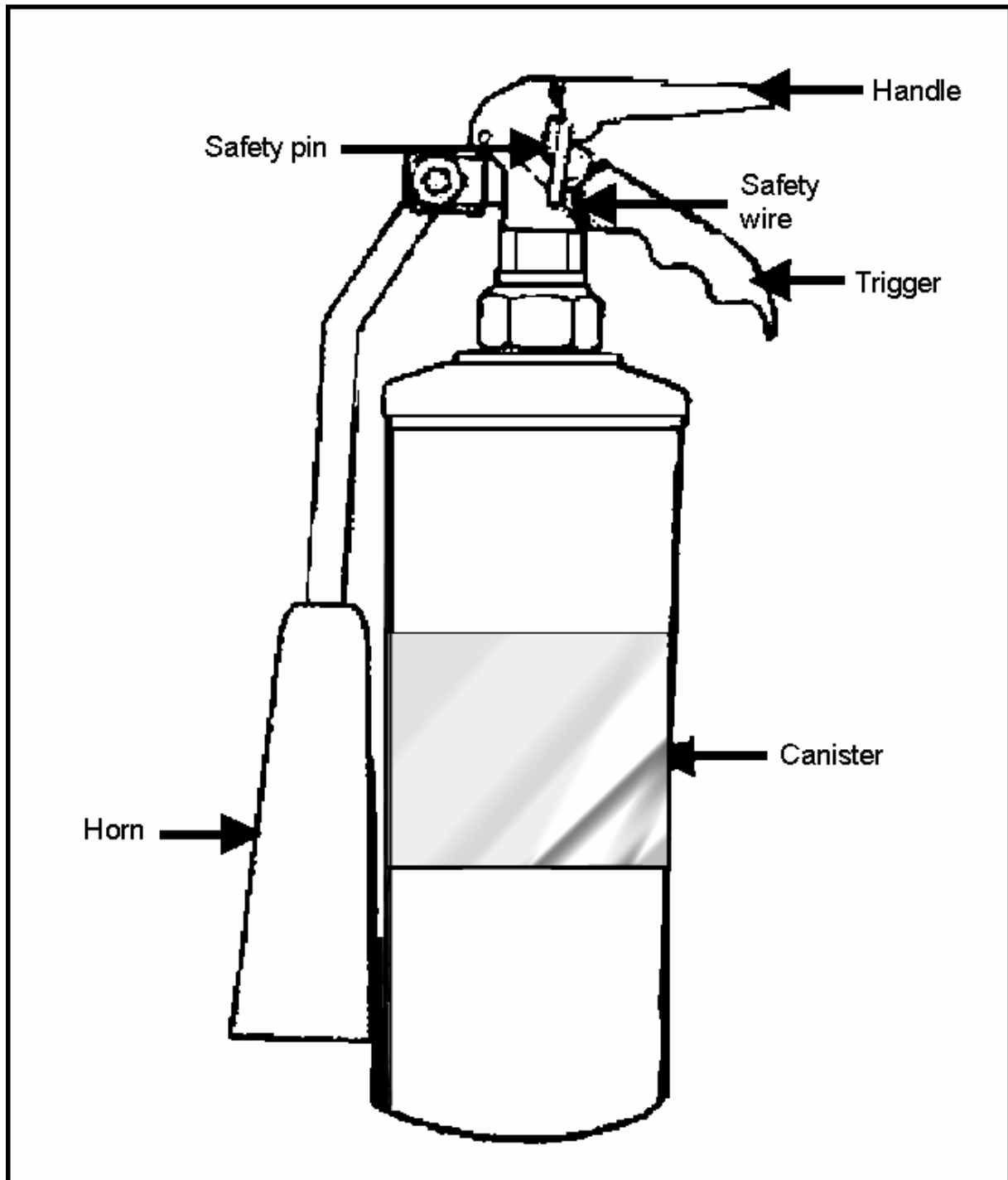


Figure 052-225-1216-4  
Portable Fire Extinguisher

- b. Break the safety wire and pull out the safety pin.
- c. Adjust the horn up to a level position.
- d. Move as close to the fire as possible and point the horn directly at the base of the flames.

**Performance Steps**

WARNING: AVOID CONTACT WITH THE FIRE AND THE FIRE-EXTINGUISHER AGENT. THE FIRE- EXTINGUISHER AGENT WILL IRRITATE THE EYES AND THROAT. IF THE FIRE IS OUTSIDE OF THE VEHICLE, APPROACH THE VEHICLE WITH THE WIND AT YOUR BACK.

- e. Press down and hold the trigger to shoot the fire-extinguisher agent at the flames.

NOTE: If the fire was inside of the vehicle, open all of the hatches, and air out the vehicle for five minutes before reentering.

- f. Place the pin back into the trigger.
- g. Turn the horn to a downward position.
- h. Tag the fire extinguisher with the word EMPTY.
- i. Replace the empty fire extinguisher as soon as possible.

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions. The evaluator will decide the location of the fire (in the engine compartment, the hull, or external) and whether the vehicle is moving or stationary.

Brief soldier: Ensure that the soldier understands that the fire is simulated for training purposes and that the fire extinguishers should not be activated.

**Performance Measures**

	<u>GO</u>	<u>NO GO</u>
1. Stopped the vehicle.	—	—
2. Pulled hard on the internal fire-extinguisher handle and let go.	—	—
3. Extinguished the fire by using the interior fixed fire-extinguisher handle.	—	—
4. Extinguished the fire by using the exterior fixed fire-extinguisher handle.	—	—
5. Extinguished the interior or exterior fire by using the portable fire extinguisher.	—	—

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

**References****Required****Related**

TM 5-5420-202-10

TM 5-5420-226-10

## Operate the Night Viewer on an Armored-Vehicle-Launched Bridge (AVLB)

052-225-1217

**Conditions:** As an AVLB operator in a field environment, given an AVLB (M48 or M60 tank chassis) with a completed before-operation preventive-maintenance checks and services (PMCS) and an operational AN/VVS-2 night viewer. This task is performed in the dark.

**Standards:** Install the AN/VVS-2 night viewer. Operate the viewer using the AVLB's power cable or with the battery power. Obtain clear vision through the night viewer.

### Performance Steps

1. Install the AN/VVS-2 night viewer.
  - a. Close and lock the hatch.
  - b. Open the viewer door by pivoting the door handle downward to raise the door above the hatch. Rotate the handle rearward until the door is fully open. Pivot the handle upward to lock the door into position (Figure 052-225-1217-1).
  - c. Unlock the viewer locking handle by pressing in on the detent lever and pulling the handle down and rearward 180 degrees until the handle locks (Figure 052-225-1217-1).

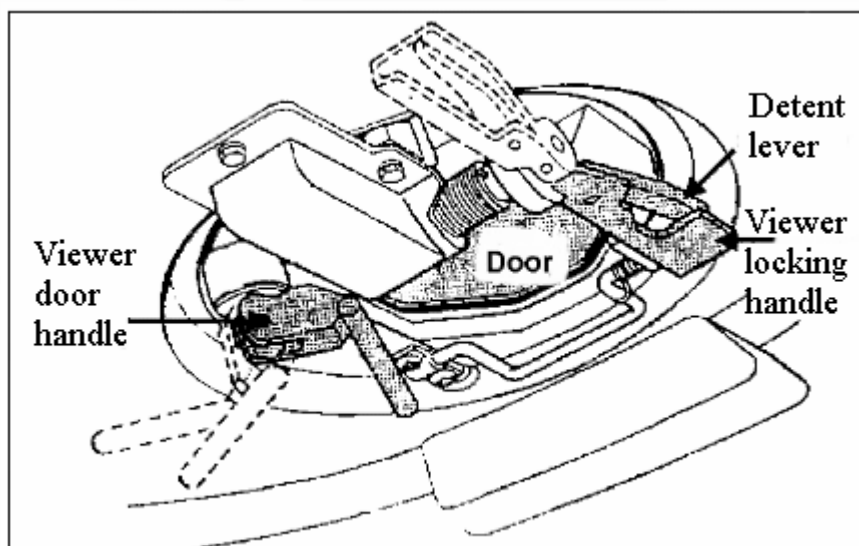


Figure 052-225-1217-1  
Viewer Door

**WARNING:** THE VIEWER LOCKING HANDLE IS SPRING LOADED (30 POUNDS PER INCH [LBS-IN]) WHEN IN THE REARWARD POSITION. WHEN THE DETENT LEVER IS PRESSED, THE HANDLE RELEASES ABRUPTLY TO THE FORWARD POSITION. ENSURE THAT FINGERS ARE CLEAR.

**NOTE:** Ensure that the seal is seated properly in the hatch groove.

- d. Remove the viewer from its stowage box.
- e. Remove the lens cover and store in the stowage box.
- f. Mount the viewer on the periscope mount. If necessary, rotate the mounting. The sides of the mounting plate should be in line with the sides of the viewer (Figure 052-225-1217-2).

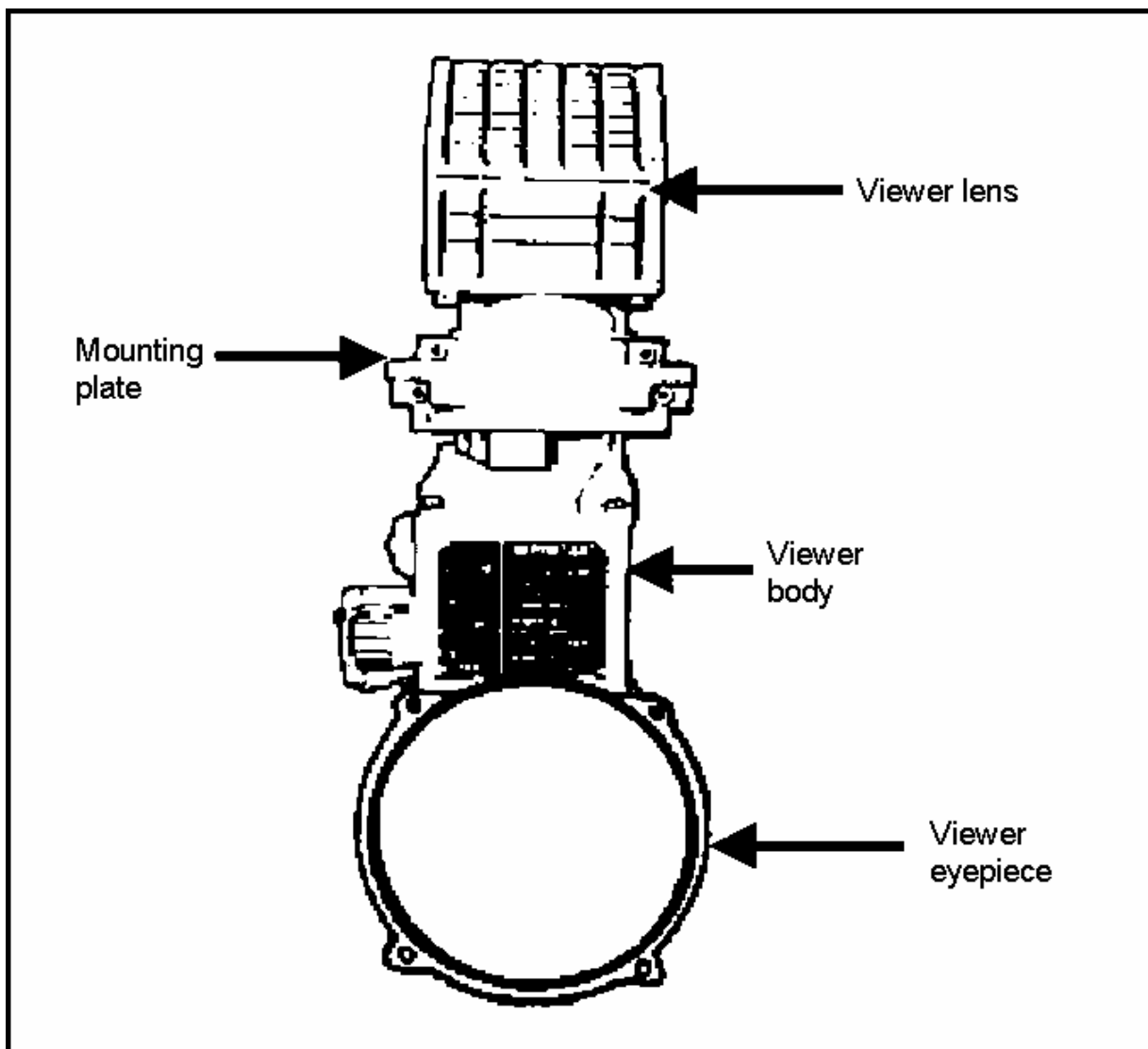
**Performance Steps**

Figure 052-225-1217-2  
AN/VVS-2 Night Viewer

- g. Hold the viewer in a vertical position and carefully raise the head through the hatch (Figure 052-225-1217-3).
- h. Engage the front edge of the mounting plate with the slots at the front of the hatch. Move the rear end of the mounting plate upward until the viewer is vertical (Figure 052-225-1217-3).

## Performance Steps

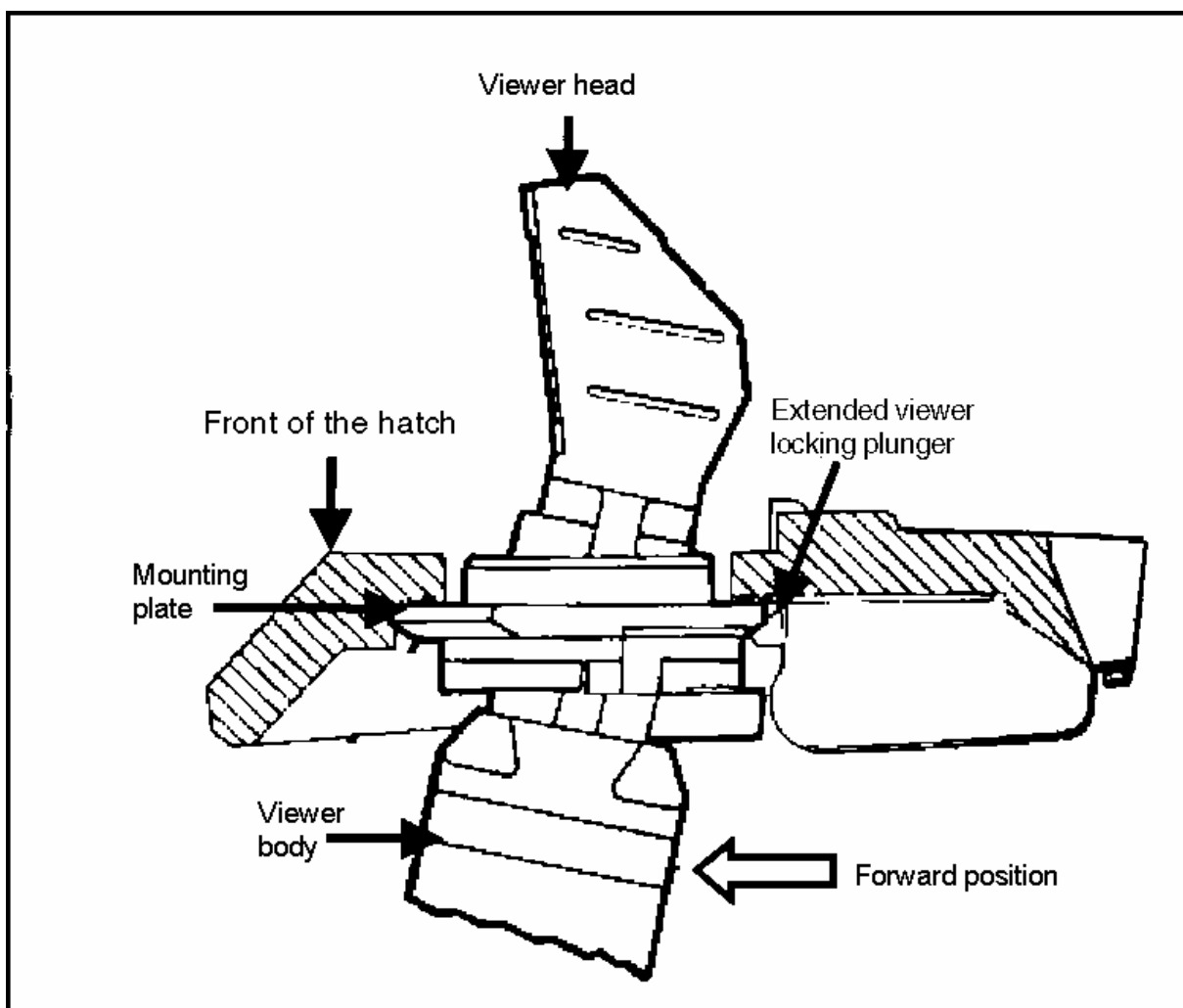


Figure 052-225-1217-3  
Mounting the Viewer Into the Hatch

**WARNING:** THE VIEWER LOCKING HANDLE IS SPRING LOADED (30 LBS-IN WHEN IN THE REARWARD POSITION). WHEN THE DETENT LEVER IS PRESSED, THE HANDLE WILL RELEASE ABRUPTLY TO THE FORWARD POSITION. ENSURE THAT FINGERS ARE CLEAR.

- i. Hold the locking lever handle, press in the detent lever, and allow the handle to slowly rotate down and forward (180 degrees). Push the handle up until the lever locks.

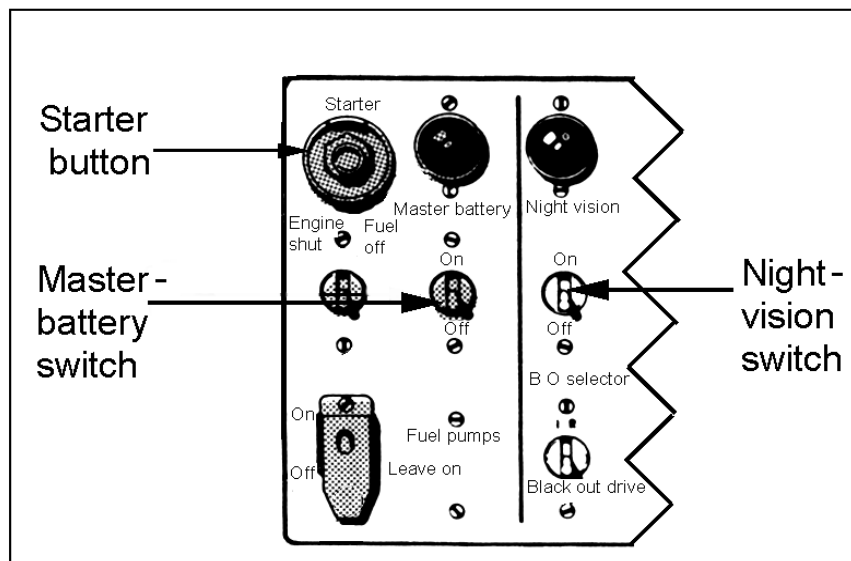
**Note:** Before releasing the viewer, shake it to ensure that it is seated firmly in place.

- j. Remove the viewer eyepiece and stow it in the stowage box.

**WARNING:** REMOVE THE VIEWER BATTERY AND STORE IT THE STOWAGE BOX BEFORE CONNECTING THE VEHICLE'S POWER CABLE. AN INSTALLED BATTERY WILL OVERHEAT AND MAY EXPLODE WHEN THE VEHICLE'S POWER CABLE IS USED, CAUSING INJURY TO PERSONNEL OR EQUIPMENT DAMAGE.

- k. Close and lock the stowage box.

2. Connect the vehicle's power cable to the AN/VVS-2 night viewer.
  - a. Ensure that the master-battery switch and the night-vision switch are in the OFF position (Figure 052-225-1217-4).



### Performance Steps

Figure 052-225-1217-4  
Vehicle Panel

- b. Unscrew the battery cap, and remove the battery from the battery compartment (Figure 052-225-1217-5). Replace the battery cap.



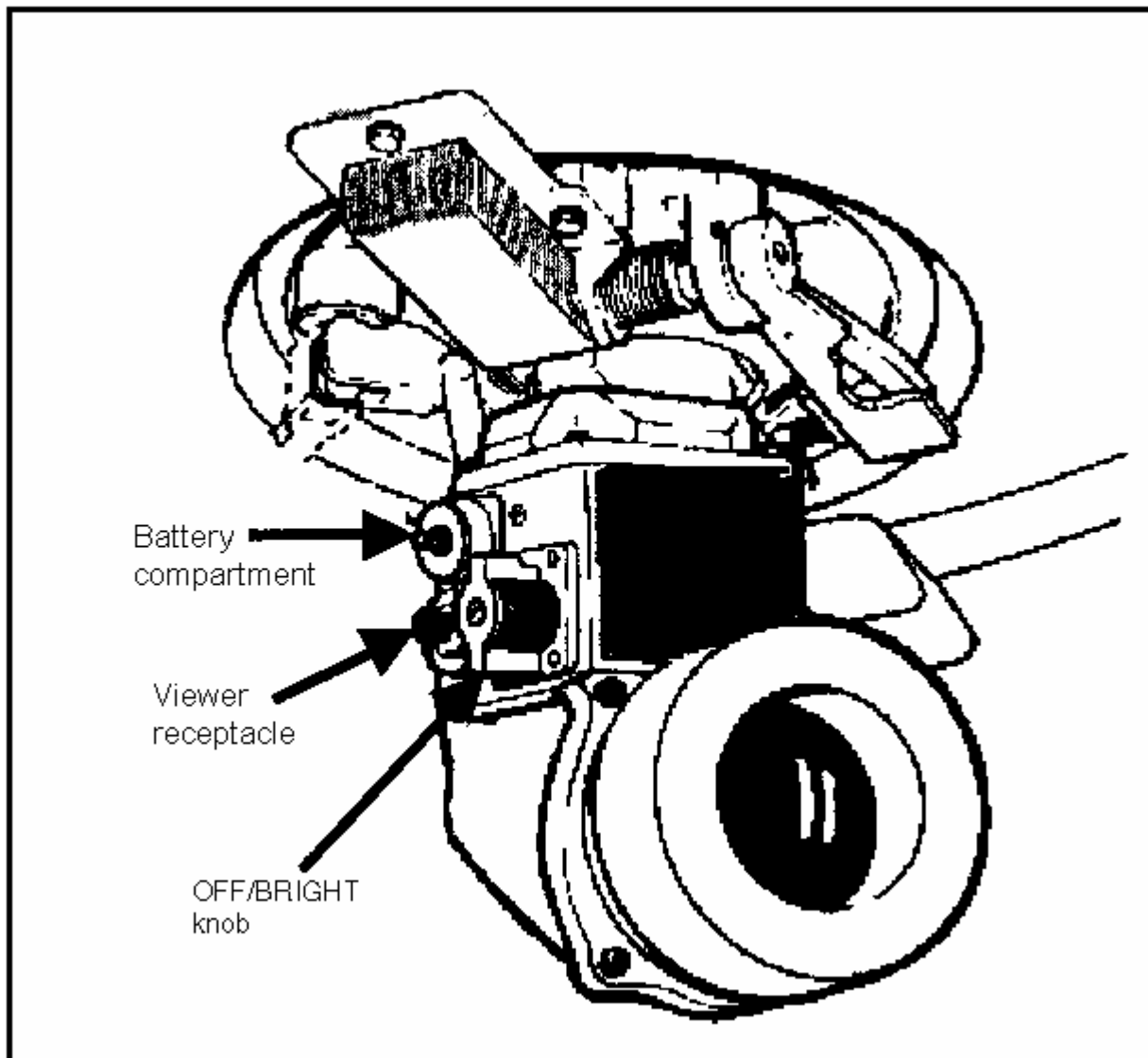
**Performance Steps**

Figure 052-225-1217-5  
Viewer Components

- c. Disconnect the power cable from the dummy receptacle (Figure 052-225-1217-6).

## Performance Steps

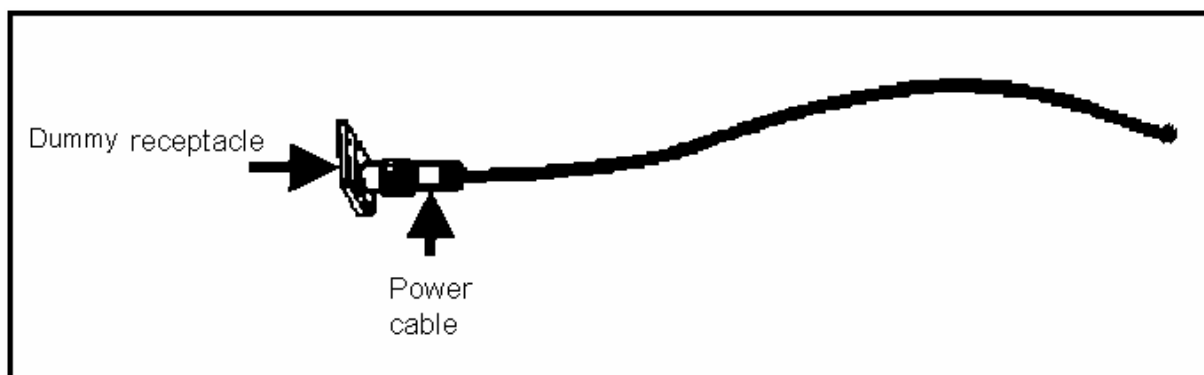


Figure 052-225-1217-6  
Power Cable

- d. Remove the viewer receptacle cover, and connect the power cable to the receptacle.
- e. Set the master-battery switch to the ON position.
- f. Set the night-vision switch to the ON position.
- g. Turn the viewer OFF/BRIGHT knob to the full bright position.

NOTE: When the viewer is directed toward a bright light source, the picture in the viewer will flash or briefly go blank.

NOTE: When operating under very low light conditions, the viewer's range and picture may be improved by turning on the vehicle's infrared (IR) headlights.

3. Use the vehicle's battery power to operate the AN/VVS-2 night viewer.

NOTE: If the power cable is connected to the viewer, ensure that the master-battery switch is in the OFF position before disconnecting the power cable.

- a. Ensure that the master-battery switch and the night-vision switch are in the OFF position.
- b. Disconnect the power cable from the viewer receptacle and connect it to the dummy receptacle (if connected).
- c. Install the cover on the connector.
- d. Unscrew the battery cap, and insert the battery in the viewer, positive end first.

NOTE: The battery and one spare battery are stowed in the viewer's carrying case.

- e. Reinstall the battery cap.
- f. Turn the viewer OFF/BRIGHT knob in the direction shown on the arrow.

4. Remove the AN/VVS-2 night viewer from operation.

- a. Rotate the OFF/BRIGHT knob to the OFF position.
- b. Ensure that the master-battery switch and the night-vision switch are in the OFF position.
- c. Disconnect the power cable from the viewer and connect it to the dummy receptacle (if it is connected).
- d. Install the viewer receptacle cap.
- e. Unscrew the battery cap. Remove and discard the battery (if it is installed).
- f. Turn the viewer to the straight-forward (detent) position.
- g. Remove the snap from the eyepiece cover stored in the stowage box and install on the viewer's eyepiece cover.
- h. Support the viewer with your left hand, press the release lever, and pull the handle forward (180 degrees) until the handle locks into place. Lower the rear end of the viewer downward to clear the locking plunger. Slide the viewer rearward to disengage the forward mount, and carefully lower the viewer from the hatch.
- i. Remove the snap from the lens cover stored in the stowage box and install on the viewer's lens cover.
- j. Stow the viewer in the stowage box.

**Performance Steps**

- k. Hold the viewer locking handle, press the lever, and allow the handle to rotate down and forward. Push the handle up until the lever locks into place.
- l. Unlock and rotate the periscope's door handle counterclockwise until the door is over the opening in the hatch. Pivot the handle down to drop the door into place. Pivot the handle up to lock the door.

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions.

Brief soldier: Tell the soldier that he will be required to complete the performance measures according to the standards set forth in this task.

**Performance Measures****GO**    **NO GO**

1. Installed the AN/VVS-2 night viewer for operation.

\_\_\_\_\_

2. Operated the viewer using the vehicle's cable power.

\_\_\_\_\_

3. Operated the viewer using battery power.

\_\_\_\_\_

4. Removed the viewer from operation.

\_\_\_\_\_

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

**References****Required****Related**

TM 5-5420-202-10

TM 5-5420-226-10

**Stop the Engine on an Armored-Vehicle-Launched Bridge (AVLB)****052-225-1250**

**Conditions:** As an AVLB operator in a field environment, given an operational AVLB (an M48 or M60 tank chassis) with a completed before- and during-operation preventive-maintenance checks and services (PMCS), with the vehicle's engine running. The track commander (TC) has given the order to stop the vehicle's engine.

**Standards:** Stop the vehicle's engine without causing injury to personnel and equipment damage.

**Performance Steps**

1. Bring the moving vehicle to a stop by releasing the accelerator pedal and gradually pressing down on the brake pedal until the vehicle stops (Figure 052-225-1250-1).
2. Move the transmission shift lever to the neutral position (Figure 052-225-1250-1).

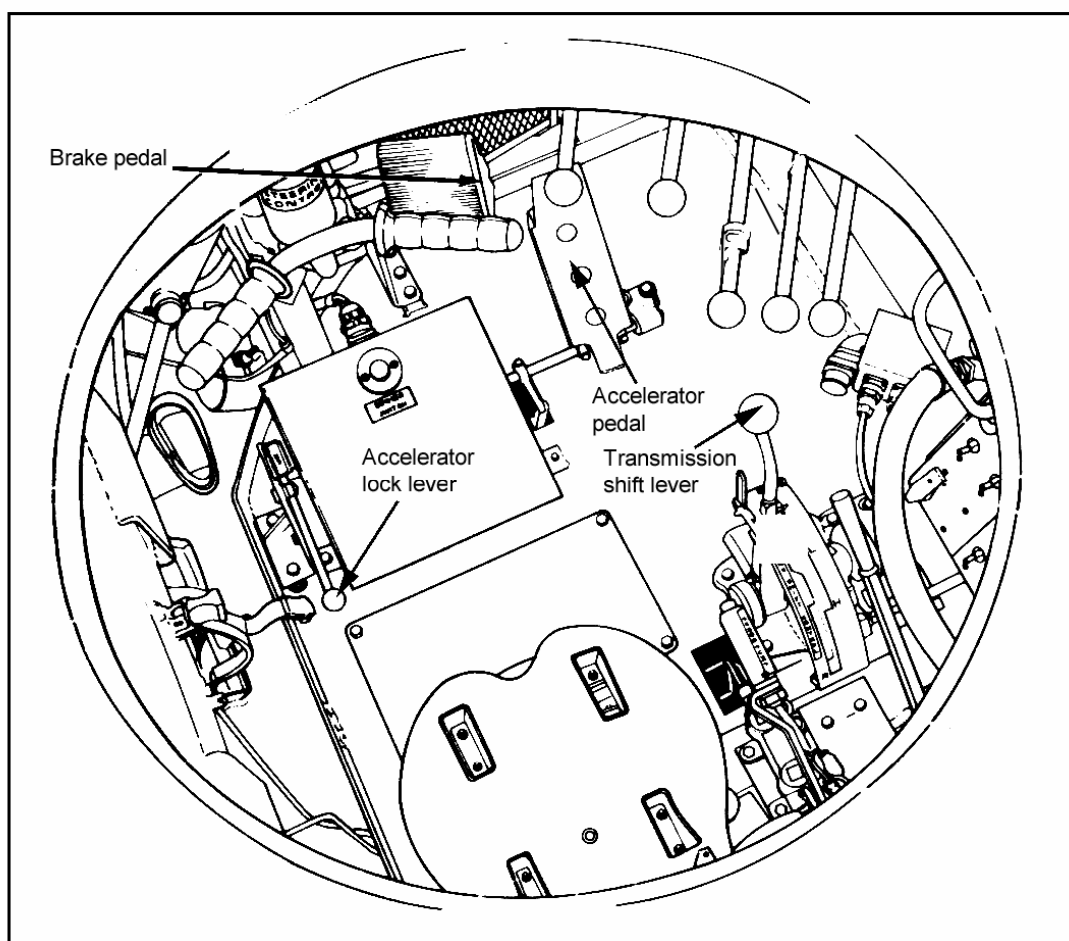


Figure 052-225-1250-1  
Operator's Compartment

3. Set the parking brake.

**Performance Steps**

NOTE: When applying pressure to the brake pedal, do not allow the pressure gauge to exceed 900 pounds per square inch (psi). The brake will be hard to release if the pressure exceeds 900 psi.

4. Press the accelerator pedal down until the tachometer reads between 1,000 to 1,200 revolutions per minute (rpm) for 5 minutes, allowing the engine to cool.
5. Release the accelerator pedal, and allow the engine to idle between 700 to 750 rpm for an additional 5 minutes.
6. Set all of the electrical equipment to the OFF position.
7. Push up and hold the engine fuel-shutoff switch in the OFF position until the engine stops (Figure 052-225-1250-2).

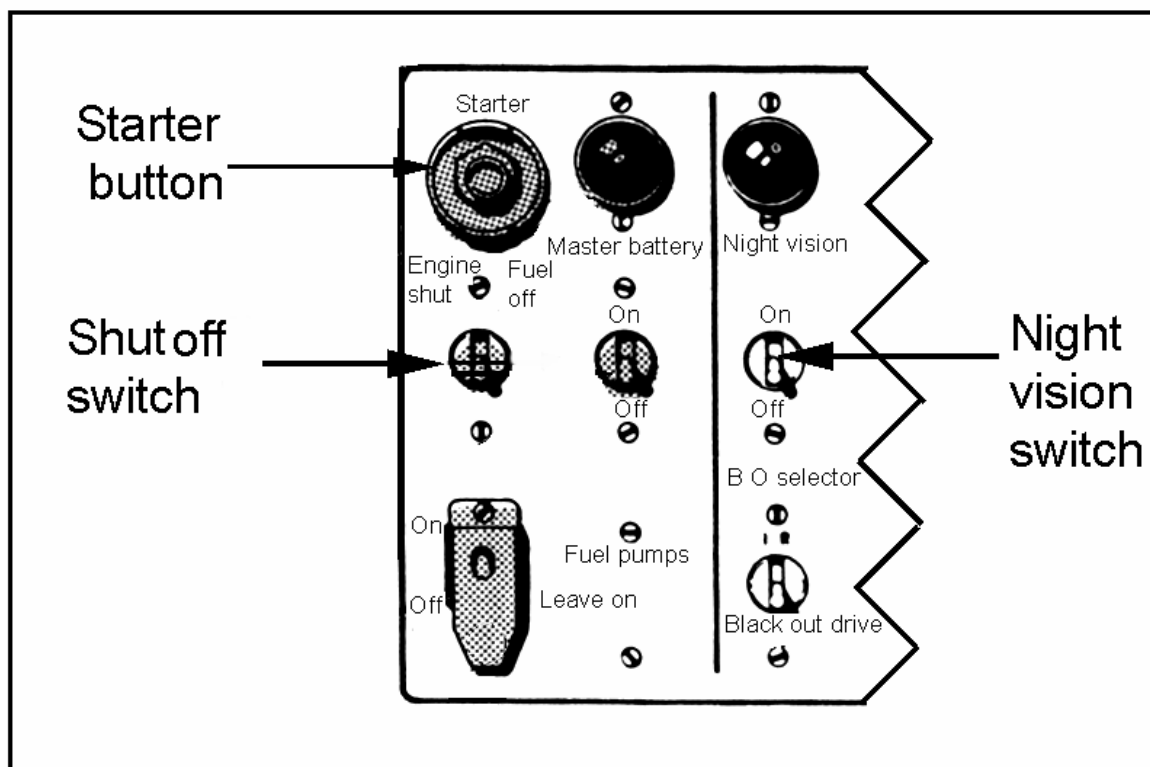


Figure 052-225-1250-2  
Engine Fuel-Shutoff Switch on the AVL B

NOTE: If the engine does not stop within 15 seconds, shut off the fuel by simultaneously pulling the manual fuel-shutoff handle out and increasing the engine's rpm to 1,400. Notify organizational maintenance of a failure with the fuel-shutoff switch.

8. Turn the master-battery switch to the OFF position.

NOTE: Place the manual fuel-shutoff handle in the OFF position if the vehicle is not going to be used for one week or more.

9. Open the crew- and the engine-compartment drain valves (Figure 052-225-1250-3).

Performance Steps

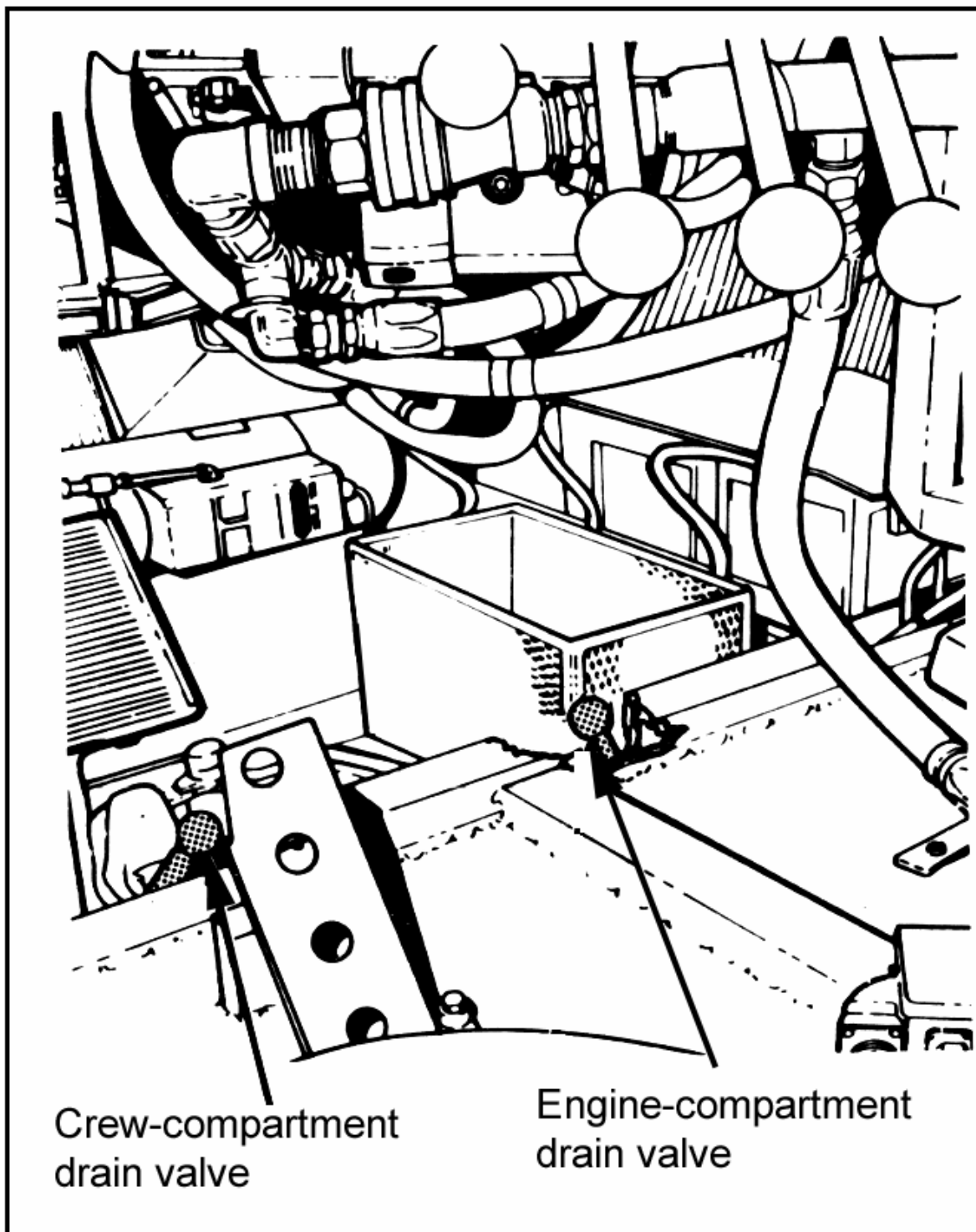


Figure 052-225-1250-3  
Drain Valves

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions. Tell the soldier to shut off the engine.

Brief soldier: Tell the soldier that he will be required to complete the performance measures according to the standards set forth in this task.

<b>Performance Measures</b>	<b><u>GO</u></b>	<b><u>NO GO</u></b>
1. Brought the vehicle to a stop and moved the transmission to the neutral position.	—	—
2. Set the parking brake.	—	—
3. Pressed the accelerator pedal down until the tachometer read between 1,000 to 1,200 rpm for 5 minutes.	—	—
4. Released the accelerator pedal and idled the engine between 700 to 750 rpm for an additional 5 minutes.	—	—
5. Turned all of the electrical equipment to the OFF position.	—	—
6. Pushed up and held the engine fuel-shutoff switch until the engine stopped.	—	—
7. Set the master-battery switch to the OFF position.	—	—
8. Opened the crew- and the engine-compartment drain valves.	—	—

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

#### **References Required**

**Related**  
TM 5-5420-202-10  
TM 5-5420-203-14  
TM 5-5420-226-10

## Hydraulically Slave an Armored-Vehicle-Launched Bridge (AVLB)

**052-226-0202**

**Conditions:** As an AVLB operator in a field environment, given two AVLBS (an M48 or M60 tank chassis), two crews, a completed before-operation preventive-maintenance checks and services (PMCS), a set of hydraulic slave hoses, clean rags, and Technical Manual (TM) 5-5420-202-10 or TM 5-5420-226-10. One AVLB is hydraulically inoperable.

**Standards:** Connect the slave hoses between the two AVLBS, allowing the operational launcher to supply the hydraulic power for the nonoperational launcher. Avoid injury to personnel and equipment damage.

### Performance Steps

1. Perform hydraulic slaving operations on the operational AVLB.
  - a. Set the parking brake.
  - b. Ensure that the hydraulic-pump clutch lever is down, and relieve the pressure in the hydraulic system.
  - c. Open the track-commander's (TCs) hatch and position the slave hoses through the opening (one male and one female end).
  - d. Disconnect the vehicle's hydraulic hoses, and connect the hydraulic slave hoses.
  - e. Start the engine, pull up on the hydraulic-pump clutch lever, and lock the engine idle at 1,800 revolutions per minute (rpm).
  - f. Signal for the bridge launch.
  - g. Push down the accelerator lock lever and the hydraulic-pump clutch lever. Shut off the engine.
  - h. Disconnect the slave hoses, and reconnect the vehicle's hydraulic hoses.
  - i. Clean up any spilled hydraulic fluid.
  - j. Clean the slave hoses with solvent and dry thoroughly. Install the dust caps. Stow the hoses.
2. Perform hydraulic slaving operations on a nonoperational AVLB.
  - a. Set the parking brake.
  - b. Ensure that the hydraulic-pump clutch lever is down, and relieve the pressure in the hydraulic system.
  - c. Open the TCs hatch, and position the slave hoses through the opening (one male and one female end).
  - d. Disconnect the vehicle's hydraulic hoses, and connect the slave hoses.
  - e. Launch or retrieve the bridge.
  - f. Relieve the pressure in the hydraulic system.
  - g. Disconnect the slave hoses, and reconnect the vehicle's hydraulic hoses.
  - h. Clean up any spilled hydraulic fluid.
  - i. Clean the slave hoses with solvent and dry thoroughly. Install the dust caps. Stow the hoses.

**Evaluation Preparation:** Setup: Two operational vehicles may be used to evaluate this task. The soldier will be evaluated on the performance measures covering the vehicle for which he is responsible.

**Brief soldier:** Inform the soldier about the operational status of the two vehicles and assign him responsibility for one of the two.

### Performance Measures

	<u><b>GO</b></u>	<u><b>NO GO</b></u>
1. Performed hydraulic slaving operations on an operational AVLB.	—	—
2. Performed hydraulic slaving operations on a nonoperational AVLB.	—	—

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.



**References**

**Required**

TM 5-5420-202-10

TM 5-5420-226-10

**Related**

**Retrieve the Armored-Vehicle-Launched Bridge (AVLB): Operator**  
**052-226-1013**

**Conditions:** As an AVLB operator in a field environment, given an AVLB (an M48 or M60 tank chassis) with a completed before- and during-operation preventive-maintenance checks and services (PMCS), a track commander (TC), and a launched bridge with a 60-foot span.

**Standards:** Follow the directions given by the TC, position the launcher, extend the launching assembly, and connect the launcher to the bridge. Retrieve the bridge within 2 minutes of the TC attaching the hydraulic lines. Keep the far-shore end of the bridge no higher than 2 feet off of the ground. Avoid injury to personnel and equipment damage.

**Performance Steps**

1. Ensure that the bridge locking pins are removed and stored (when installed).
2. Ensure that the dust plugs on the launcher and the dust caps on the hydraulic hoses are removed and stored.
3. Removed the radio antenna.
4. Start the vehicle's engine, and maneuver the launcher into position, following the signals given by the TC.
5. Ensure that the transmission shift lever is in the neutral (N) position.
6. With the engine at an idle, pull up on the hydraulic-pump clutch lever to engage the hydraulic pump. Increase the engine's idle to 1,800 revolutions per minute (rpm) (Figure 052-226-1013-1).

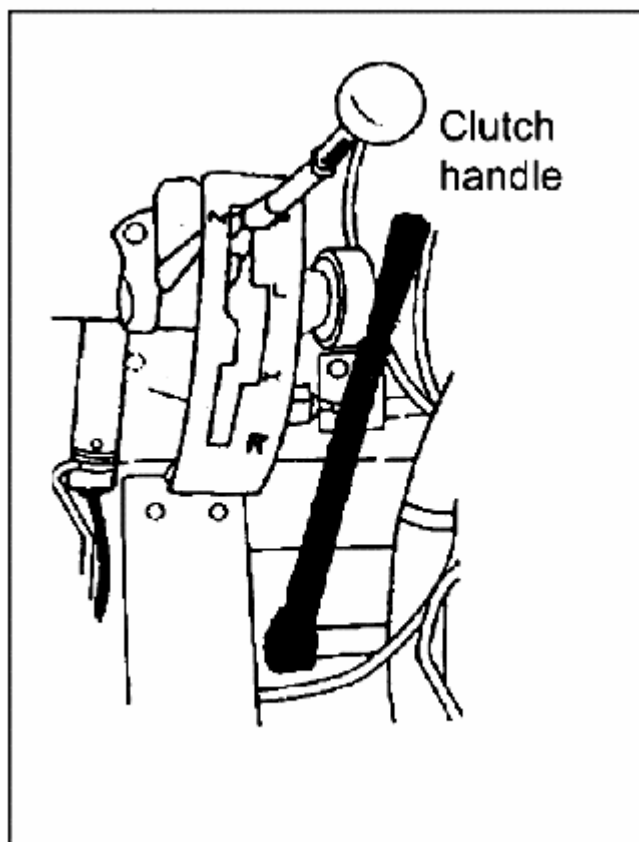
**Performance Steps**

Figure 052-226-1013-1  
Hydraulic-Pump Clutch Handle

NOTE: A snap can be felt when the clutch is properly engaged.

7. Connect the launcher to the bridge.

CAUTION: RELEASE THE PARKING BRAKES, IF ENGAGED.

- a. Pull up on the overhead-cylinder control lever (Figure 052-226-1013-2) until the outrigger makes firm contact with the ground. Release the pressure on the brake pedal, and allow the launcher to ride up on the outrigger. Release the overhead-cylinder lever when the launcher is resting firmly on the outrigger.

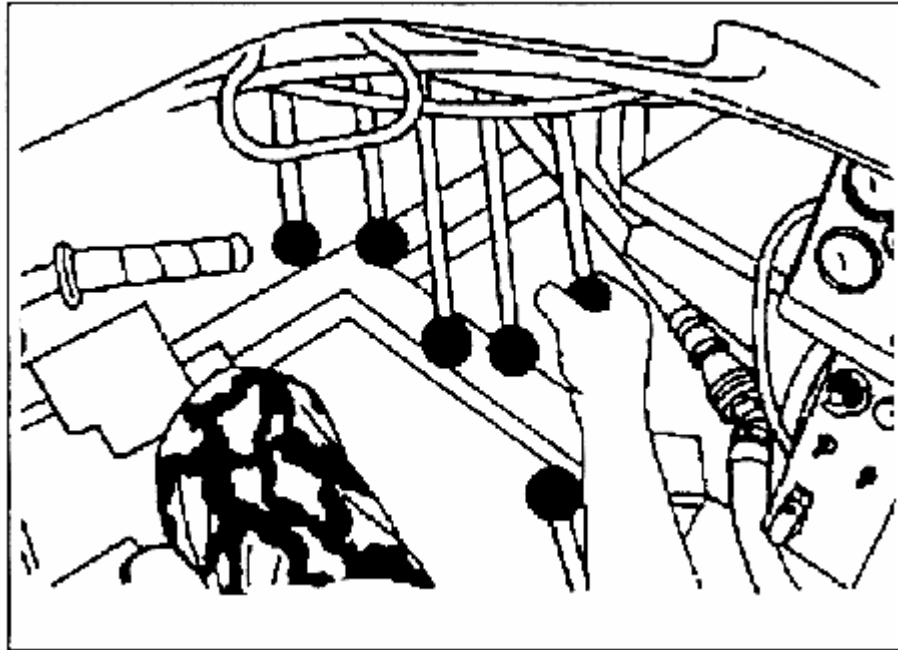
**Performance Steps**

Figure 052-226-1013-2  
Overhead-Cylinder Control Lever

- b. Pull on the tongue-cylinder control lever (Figure 052-226-1013-3) and extend the tongue cylinder (as necessary) to align the tongue pintles with the openings of the bridge diaphragm, and release the tongue-cylinder control lever.

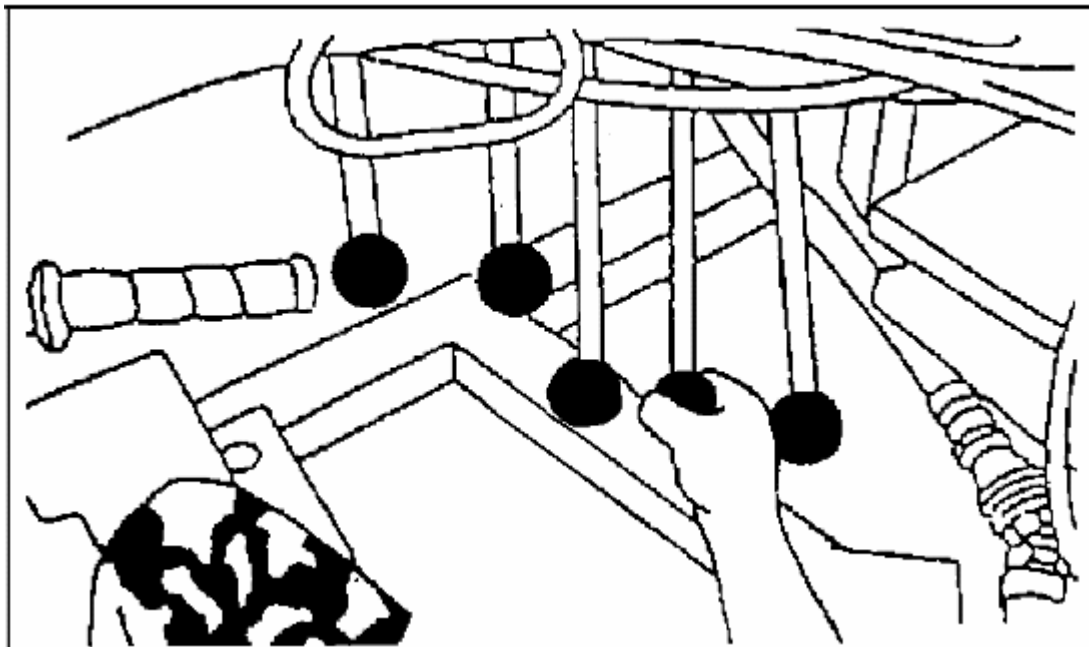


Figure 052-226-1013-3  
Tongue-Cylinder Control Level

**Performance Steps**

- c. Release the accelerator lock lever.
- d. Follow the signals given by the TC. Slowly move the vehicle forward, and align the pintles with the pintle sockets. Move the tongue-cylinder control lever up or down until the pintles are fully in line with the pintle sockets. Move the vehicle forward until the tongue fully contacts the bridge diaphragm (Figure 052-226-1013-4).

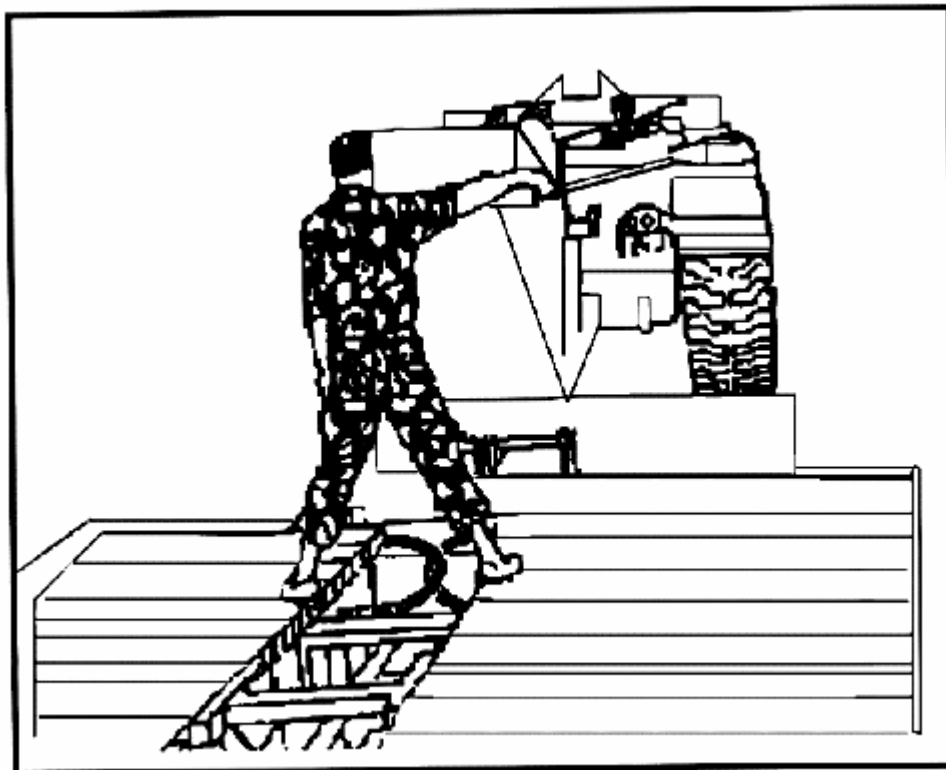


Figure 052-226-1013-4  
Positioning the Vehicle

- e. Idle the engine, and push down on the hydraulic-pump clutch.
- f. Raise the engine's idle to 1,800 rpm, and push the locking lever down to extend the locking pins.

**CAUTION:** ENSURE THAT THE LOCKING-CYLINDER PLUGS ARE ENGAGED.

- 8. Allow the engine to idle down, disengage the hydraulic pump, and cycle through the control levers to bleed the hydraulic system.

**NOTE:** THE TC CONNECTS THE HYDRAULIC HOSES AND VISUALLY CHECKS THE ASSEMBLY TO ENSURE THAT THE CONNECTION IS SECURE.

- 9. Retrieve the bridge.
  - a. Close and lock the operator's cupola.

**WARNING:** DURING BRIDGE RETRIEVAL OPERATIONS, THE OPERATOR MUST BE COMPLETELY INSIDE OF THE VEHICLE WITH THE CUPOLA COVER CLOSED. POSSIBLE INJURY OR DEATH FROM FALLING DEBRIS OR EQUIPMENT MALFUNCTION MAY OCCUR.

- b. Pull up on the hydraulic-pump clutch lever.
  - c. Raise the engine's idle to 1,800 rpm, and pull up on the accelerator lock lever.

**Performance Steps**

- d. Pull up on the scissor-cylinder control lever until the cables are tight (Figure 052-226-1013-5).

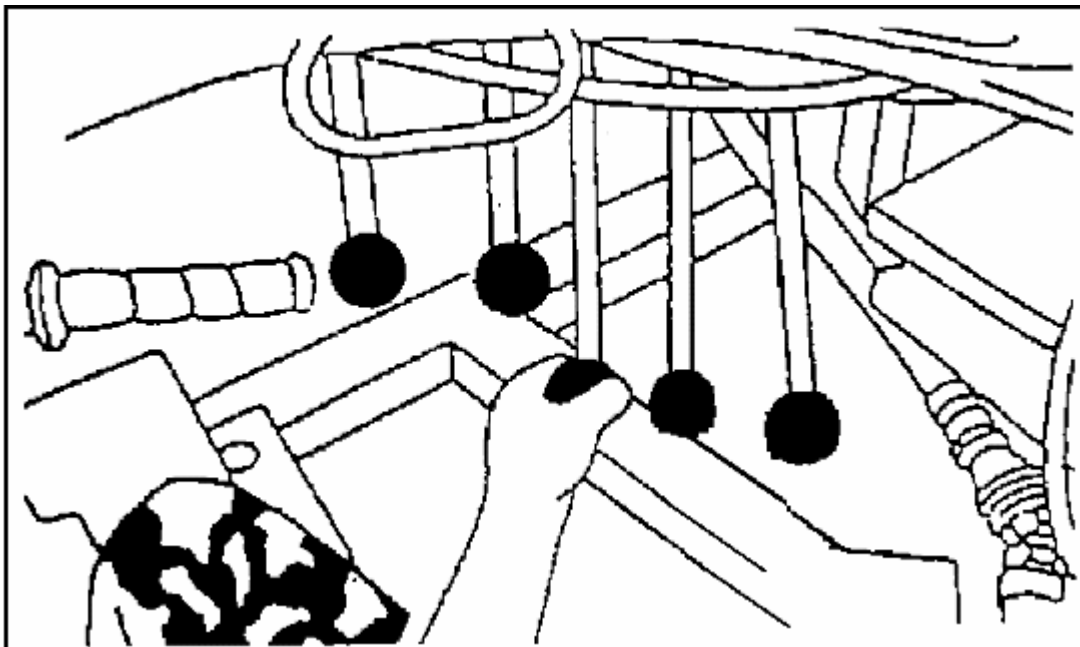


Figure 052-226-1013-5  
Scissor-Cylinder Control Lever

- e. Push the tongue-cylinder control lever all the way down, and simultaneously begin folding the bridge by pushing down on the scissor-cylinder control lever. The free end of the bridge should clear the ground by no more than 2 feet (Figure 052-226-1013-6).

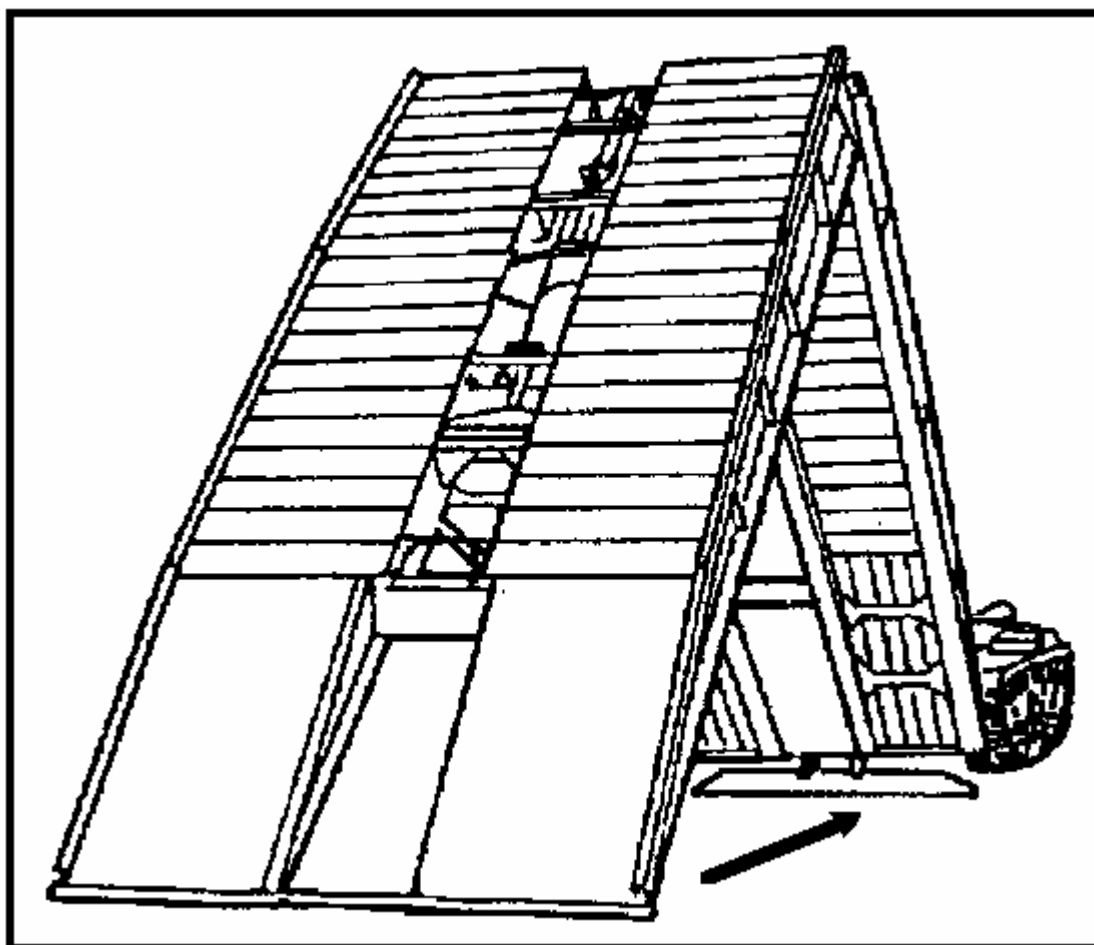
**Performance Steps**

Figure 052-226-1013-6  
Folding the Bridge

NOTE: USING THE TONGUE- AND THE SCISSOR-CYLINDER CONTROL LEVERS TOGETHER CAUSES THE BRIDGE TO FOLD AND RISE TO A VERTICAL POSITION.

WARNING: DO NOT SLAM THE BRIDGE ENDS TOGETHER, AS THIS MAY CAUSE DAMAGE TO THE EQUIPMENT.

- f. Push the overhead-cylinder control lever down to lower the bridge to the bridge seat on the vehicle's back deck (Figure 052-226-1013-7).

Performance Steps

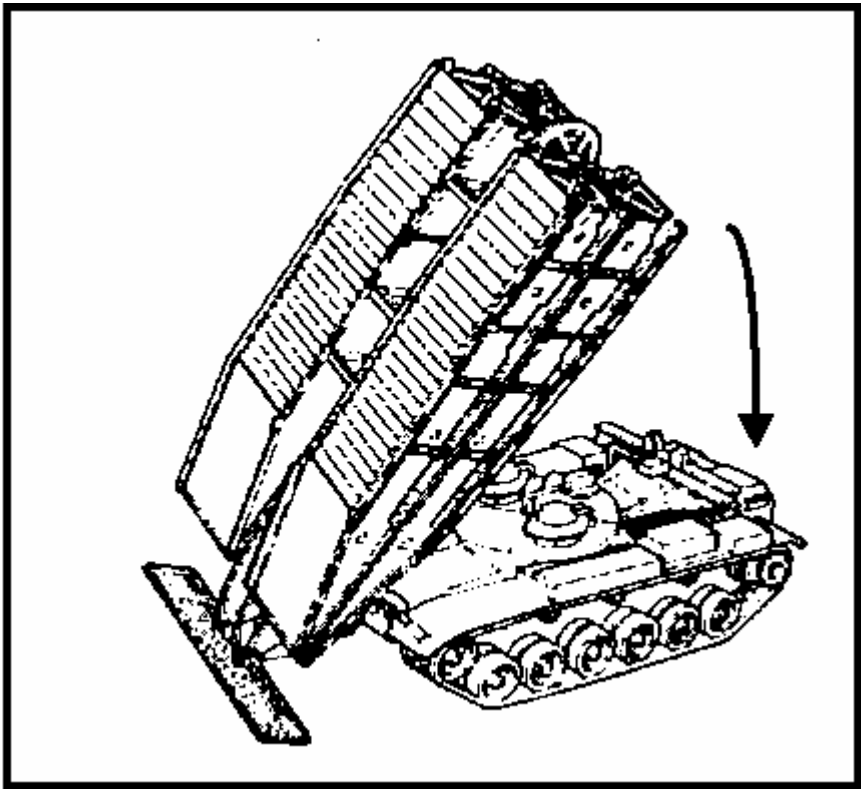


Figure 052-226-1013-7  
Lowering the Bridge to the Bridge Seat

WARNING: DO NOT SLAM THE BRIDGE DOWN ON THE VEHICLE'S BRIDGE SEAT, AS THIS MAY CAUSE DAMAGE TO THE SUPPORTING WELDS, THE BACK DECK, AND THE BRIDGE.

- g. Release the accelerator lock and idle the engine.
- h. Push down on the hydraulic-pump clutch lever, and cycle through the control levers to bleed the hydraulic system.

10. Reinstall the radio antenna.

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions statement.

Brief soldier: Tell the soldier that he will be required to complete the performance measures according to the standards set forth in this task.

Performance Measures	GO	NO GO
1. Ensured that the bridge locking pins were removed and stored (when installed).	—	—
2. Ensured that the dust plugs on the launcher and the dust caps on the hydraulic hoses were removed and stored.	—	—
3. Removed the radio antenna.	—	—
4. Started the vehicle's engine and positioned the launcher in line with the bridge.	—	—
5. Placed the transmission shift lever in the neutral (N) position, engaged the hydraulic-pump clutch, set the engine's idle to 1,800 rpm, and locked the accelerator.	—	—



**Performance Measures**

	<b><u>GO</u></b>	<b><u>NO GO</u></b>
6. Followed the signals given by the TC and connected the launcher to the bridge.	_____	_____
7. Allowed the engine to idle down, disengaged the hydraulic-pump clutch, and bleed the hydraulic system.	_____	_____
8. Retrieved the bridge and lowered it onto the vehicle's back deck.	_____	_____
9. Reinstalled the radio antenna.	_____	_____

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

**References****Required****Related**

TM 5-5420-202-10

TM 5-5420-203-14

TM 5-5420-226-10

**Launch an Armored-Vehicle-Launched Bridge (AVLB)****052-226-1049**

**Conditions:** As an AVLB operator in a field environment, given an AVLB (M48 or M60 tank chassis) with a completed before- and during-operation preventive-maintenance checks and services (PMCS), a track commander (TC), and a suitable location with a gap at least 57 feet wide.

**Standards:** Position the launcher according to the directions given by the TC. Launch the bridge over the gap within 2 minutes of positioning the vehicle. Keep the far shore no higher than 2 feet off of the ground, with a minimum 18-inch overhang on each side with prepared abutments and a minimum 36-inch overhang on each side with unprepared abutments. Disconnect the vehicle from the bridge according to the instructions given by the TC, without causing injury to personnel or equipment damage.

**Performance Steps**

1. Remove the radio antenna.
2. Start the AVLB's engine
3. Move the AVLB to a position in line with the selected site. Stop the vehicle on the shore, about 10 feet from the proposed launch site. This distance will allow sufficient space for the tongue, boom assembly, and outrigger to descend.

**CAUTION:** WHEN SELECTING A LAUNCH SITE, DO NOT EXCEED THE 15-PERCENT HILL OR 8-PERCENT SIDE-SLOPE LIMITATIONS. IT IS IMPORTANT TO CONSIDER FROM WHICH END OF THE BRIDGE YOU WILL BEGIN THE RETRIEVAL OPERATION, AS THIS END REQUIRES MORE GROUND SUPPORT.

4. Apply pressure to the brake pedal, hold, and move the transmission shift lever to the neutral (N) position. With the engine speed at an idle, pull up on the hydraulic-pump clutch lever to engage the hydraulic pump (Figure 052-226-1049-1).

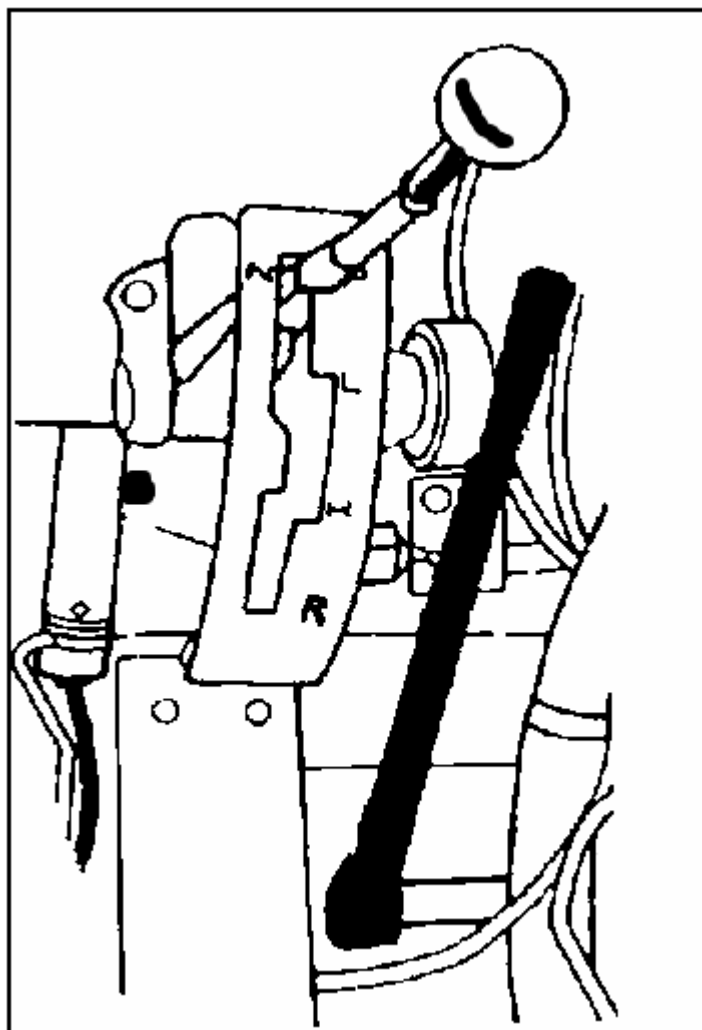
**Performance Steps**

Figure 052-226-1049-1  
Hydraulic-Pump Clutch Lever

**CAUTION:** DO NOT PULL UP ON THE HYDRAULIC-PUMP CLUTCH LEVER WITH THE ENGINE RUNNING OVER 1,000 REVOLUTIONS PER MINUTE (RPM), AS IT MAY CAUSE DAMAGE TO THE POWER TAKE-OFF COMPONENTS.

**NOTE:** A snap can be felt when the clutch is properly engaged.

5. Launch the bridge.

**Performance Steps**

NOTE: If the terrain is steep, or otherwise dangerous, it may not be necessary to use the accelerator locking lever. Based on the terrain conditions and the operator's experience, the operator should vary the engine speed by adjusting the amount of pressure on the accelerator pedal. This will help to prevent a rapid opening and swinging of the bridge and rocking of the bridge launcher.

CAUTION: NEVER PUSH DOWN ON THE OVERHEAD-CYLINDER CONTROL LEVER WHEN THE BRIDGE IS RESTING ON THE BRIDGE SEAT, AS THIS MAY CAUSE DAMAGE TO THE BRIDGE SEAT.

WARNING: WHEN LAUNCHING THE BRIDGE, THE CREW MUST BE INSIDE THE VEHICLE WITH THE COPULA COVER CLOSED OR PULLED OVER THE HATCH. DEBRIS MAY FALL FROM THE BRIDGE WHILE IT IS MOVING OVERHEAD.

- a. Press the accelerator until the engine is running at 1,800 rpm. Pull up on the accelerator lock.
- b. Pull up and hold the overhead-cylinder control lever (Figure 052-226-1049-2). This will activate the overhead cylinder to its full limit of travel and automatically release the bridge hold-down chains.

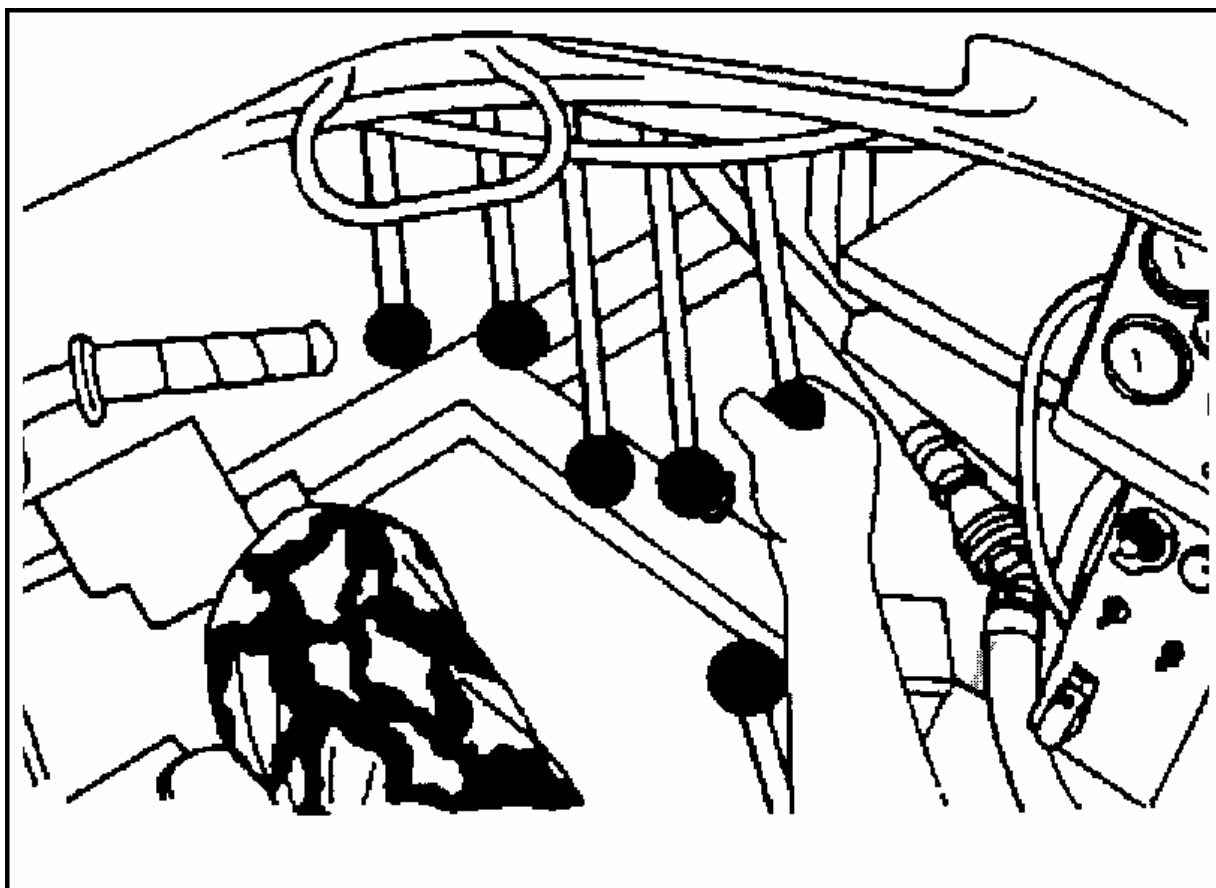


Figure 052-226-1049-2  
Overhead-Cylinder Control Lever

NOTE: Ease up on the brake pedal while extending the overhead cylinder. This allows the vehicle to ride up on the outrigger. A change in the sound of the hydraulic pump indicates that the overhead cylinder is completely extended.

**Performance Steps**

- c. Release the brake pedal and permit the launcher to ride up on the outrigger as the outrigger contacts the ground. When complete, the bridge will automatically stop in the vertical position, and the outrigger will be firmly rested on the ground (Figure 052-226-1049-3).

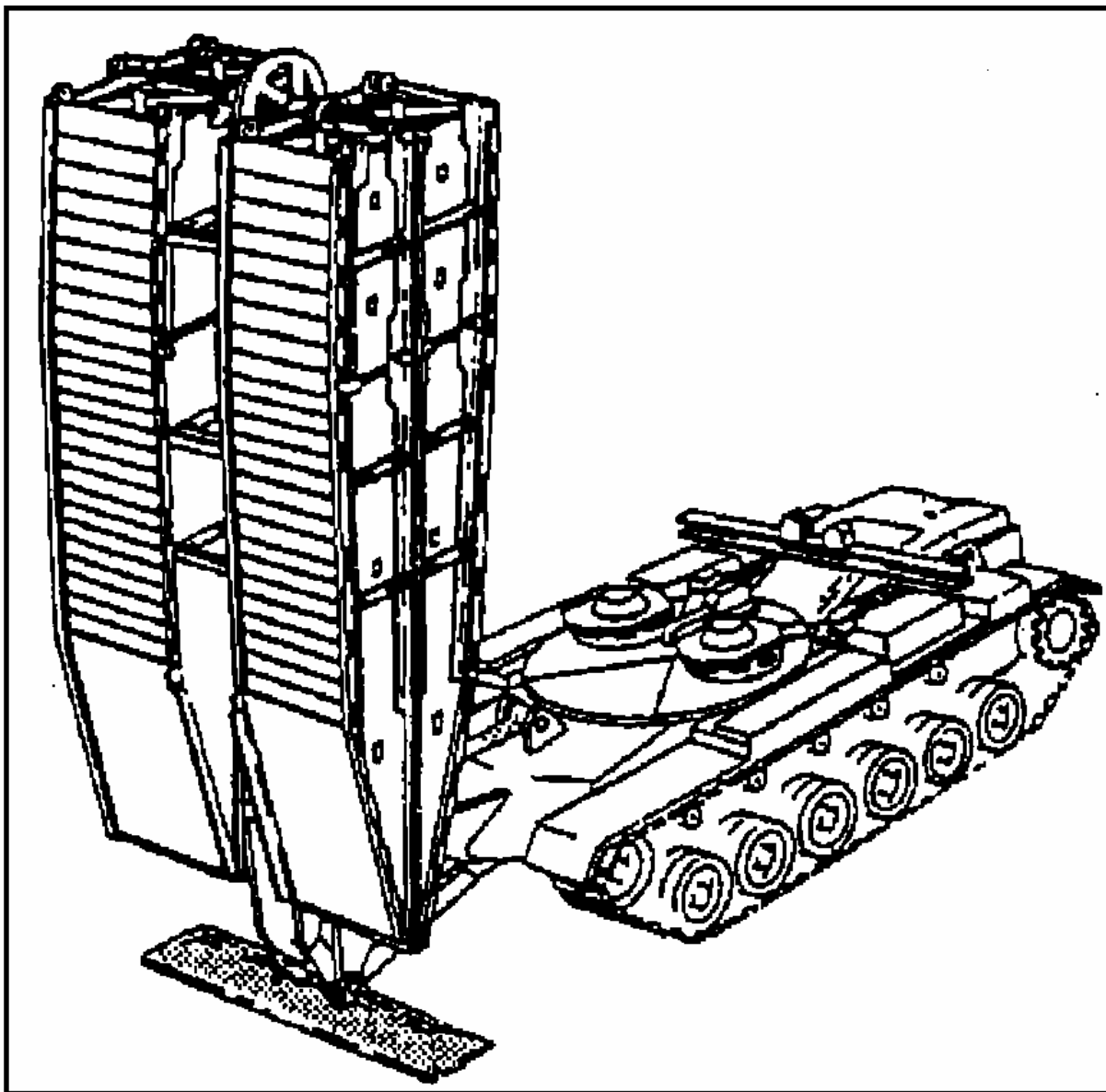


Figure 052-226-1049-3  
Bridge in the Vertical Position

- d. Press the brake pedal and move the shift lever to the park (P) position.
- e. Pull up on the tongue- and the scissor-cylinder control levers (Figure 052-226-1049-4).

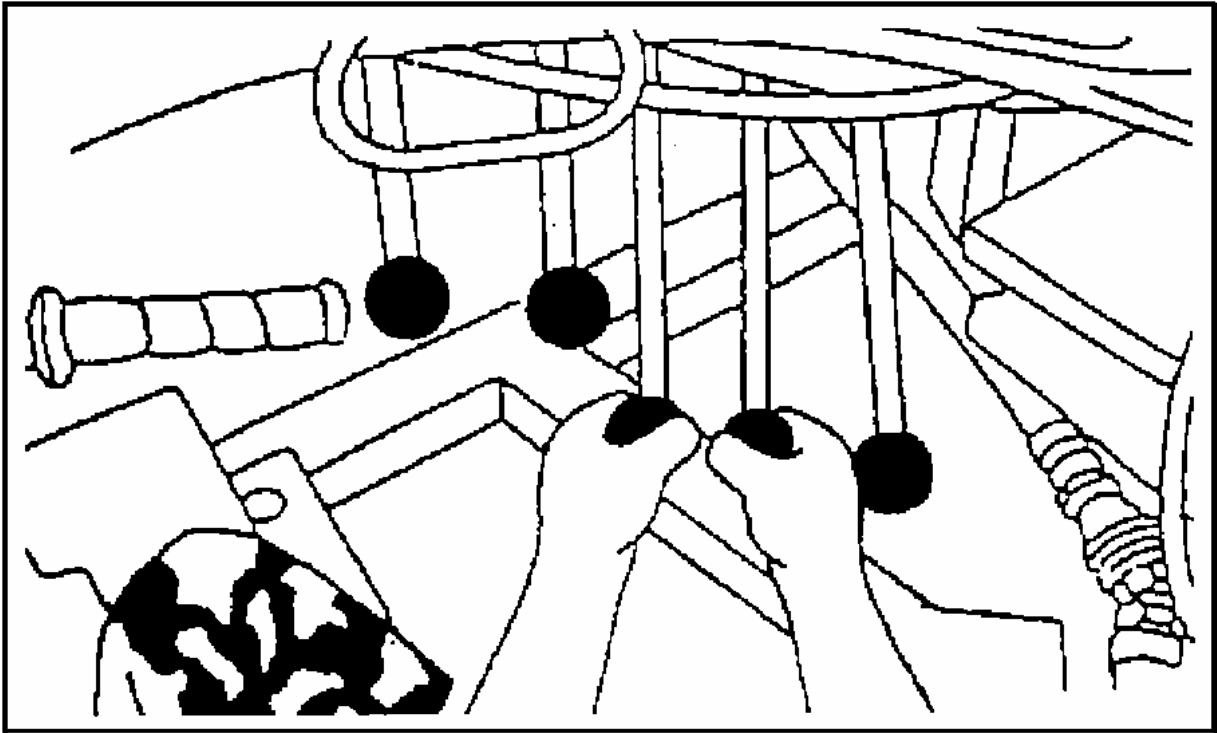
**Performance Steps**

Figure 052-226-1049-4  
Tongue-and Scissor-Cylinder Control Levers

- f. Coordinate the movement of the scissor- and the tongue-cylinder control levers to smoothly open the bridge and extend it to its full length (Figure 052-226-1049-5).

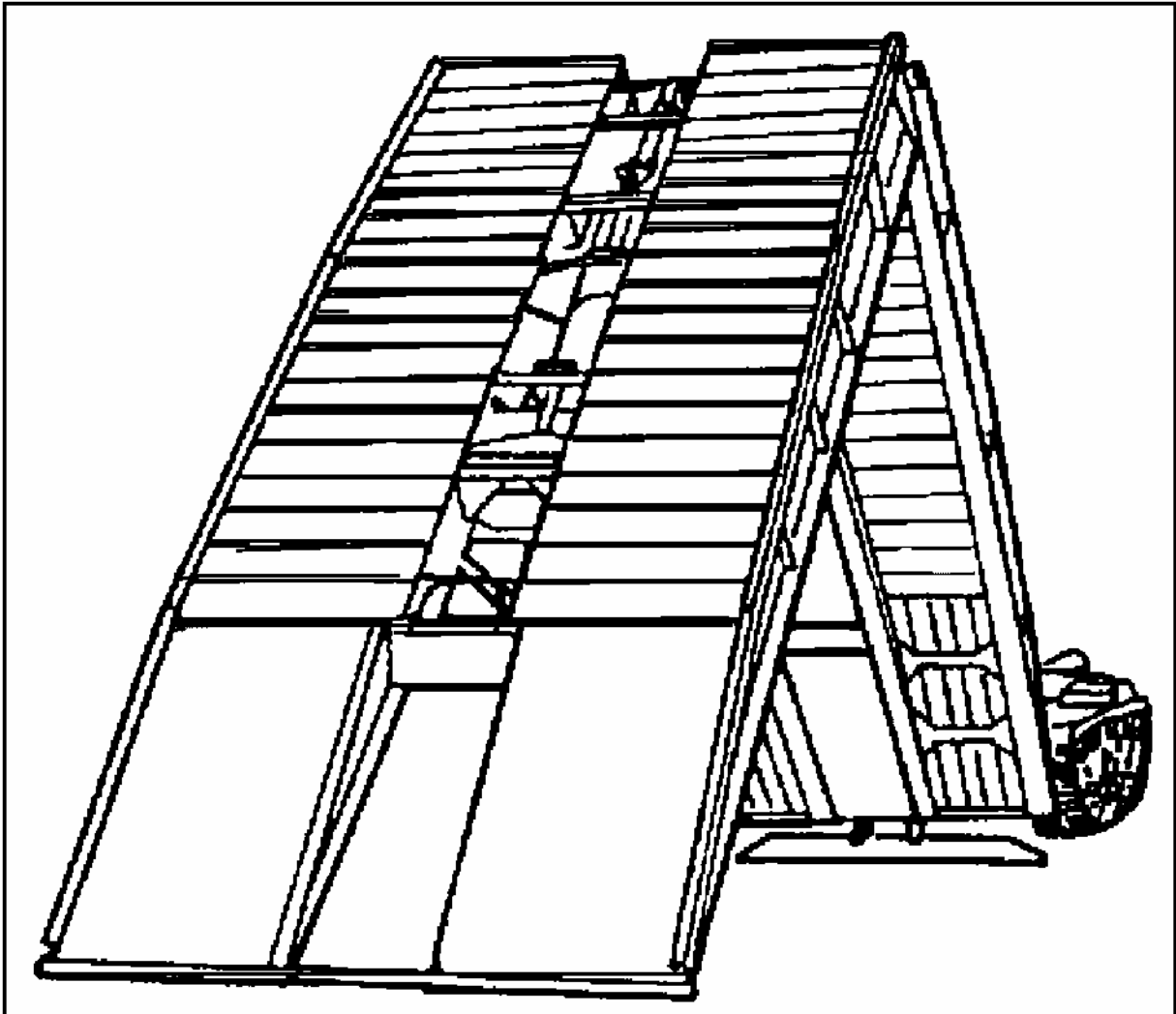
**Performance Steps**

Figure 052-226-1049-5  
Launching the Bridge

- g. Keep the far-shore end of the bridge about 2 feet off of the ground when extending the bridge (Figure 052-226-1049-6).

## Performance Steps

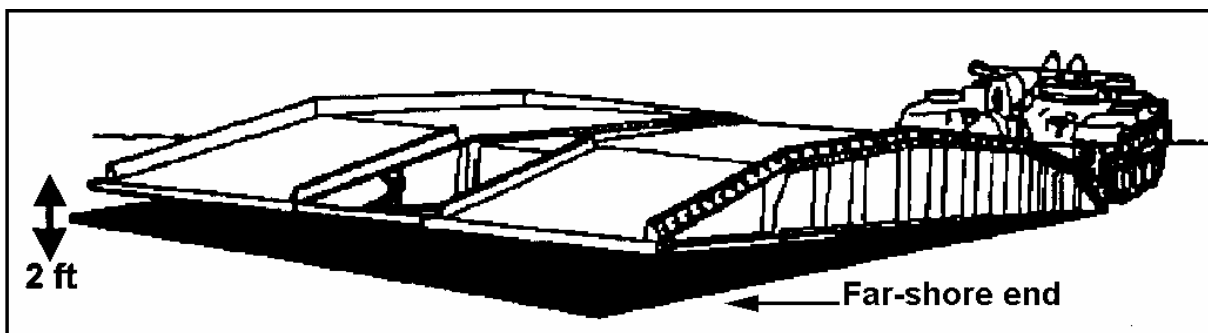


Figure 052-226-1049-6  
Extended the Bridge

- h. Release the scissor-cylinder control lever when the bridge is fully extended. At the same time, continue pulling up on the tongue-cylinder control lever to lower the bridge to the ground.
  - i. Release the tongue-cylinder control lever when the bridge reaches the ground. Ensure that there is at least an 18-inch overhang on each side of bridges with prepared abutments and a minimum 36-inch overhang on bridges with unprepared abutments.
  - j. Push down on the scissor-cylinder control lever and extend the scissor cylinder in the center of the bridge. This will allow the bridge to relax and settle on the ground. When the scissor cylinder is extended and the cables are relaxed, release the scissor-cylinder control lever.
  - k. Push down on the accelerator lock lever and the hydraulic-pump clutch lever.
  - l. Move the overhead-cylinder and the tongue-cylinder control levers up and down at least three times to bleed the hydraulic fluid back into the vehicle's hydraulic tank.
6. Disconnect the bridge.
    - a. Raise the hydraulic-pump clutch lever.
    - b. Press the accelerator down until the engine speed reaches 1,800 rpm and raises the accelerator lock lever.
    - c. Pull up on the locking-cylinder control lever until the plugs are retracted into the tongue (Figure 052-226-1049-7).



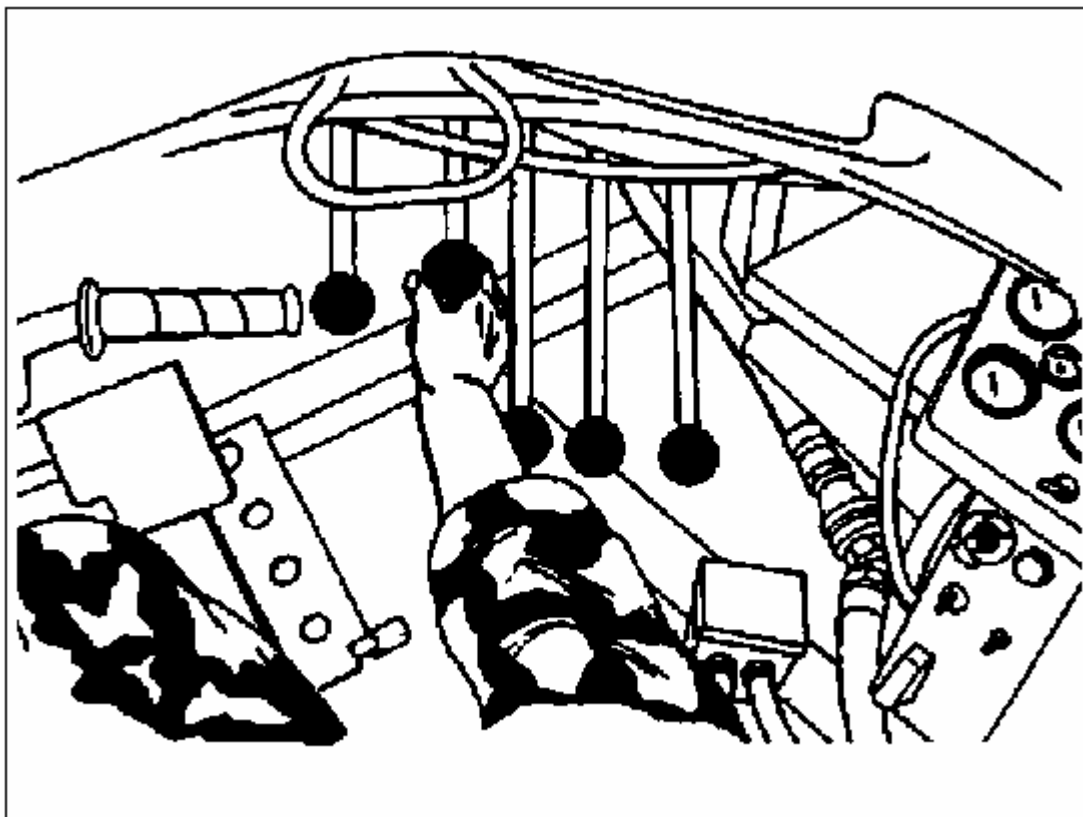
**Performance Steps**

Figure 052-226-1049-7  
Locking-Cylinder Control Lever

- d. Push down on the accelerator lock lever and the hydraulic-pump clutch lever.
- e. Move the shift lever to the reverse (R) position, and back the vehicle away from the bridge slowly.

NOTE: The quick-disconnect fittings between the launcher and the bridge will automatically release when the vehicle is backed away from the bridge.

CAUTION: DO NOT BACK THE LAUNCHER MORE THAN 19 INCHES, AS IT MAY CAUSE BULLDOZER ACTION (DIGGING IN) BY THE OUTRIGGER.

- 7. Perform the following procedures if the bridge will not release from the launcher.
  - a. Ensure that the vehicle is in the neutral (N) position. Engage the hydraulic-pump clutch lever and lock the engine speed at 1,800 rpm.
  - b. Pull up on the locking- and ejection-cylinder control levers simultaneously to push the bridge from the launcher (Figure 052-226-1049-8).

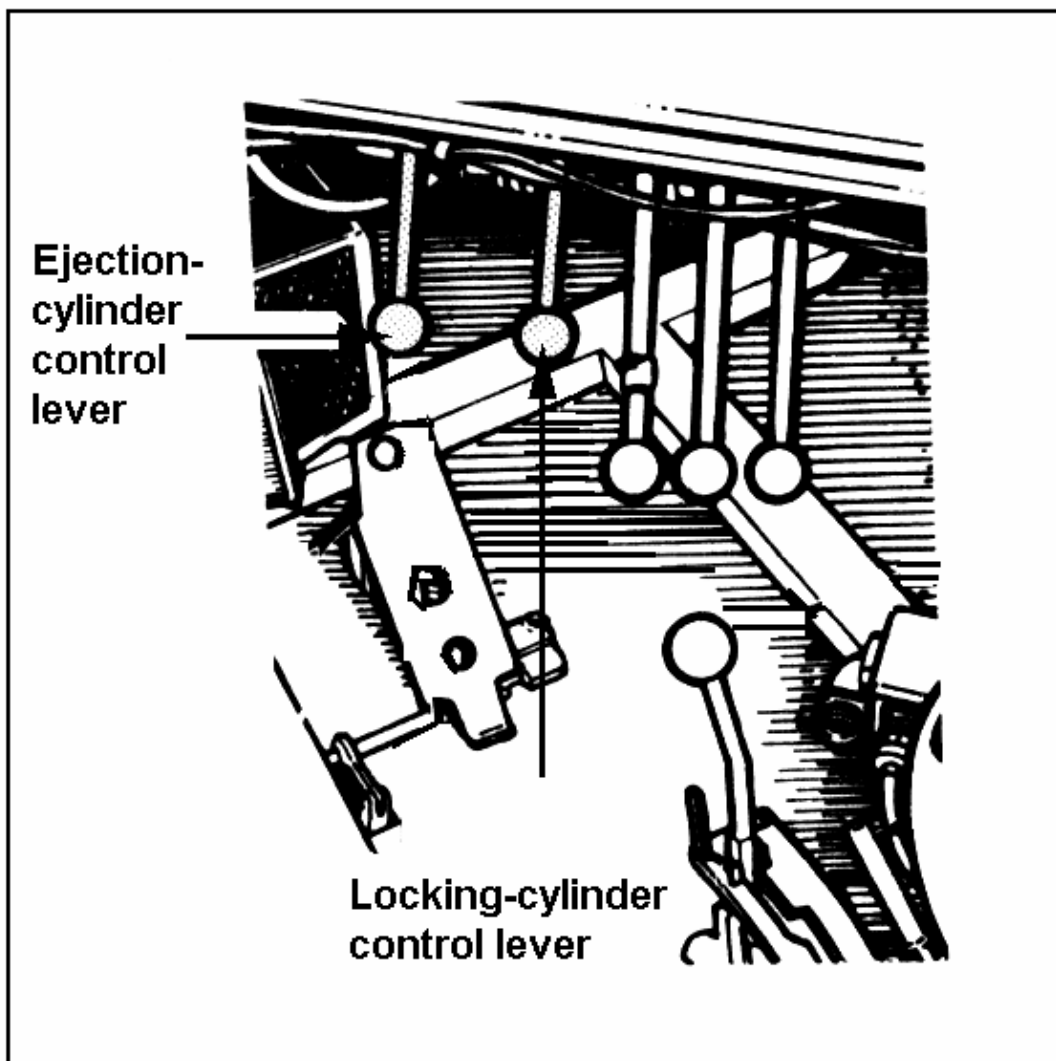
**Performance Steps**

Figure 052 226-1049-8  
Locking- and Ejection-Cylinder Control Levers

- c. Pull up on the locking-cylinder control lever, and push down on the ejection-cylinder control lever simultaneously to retract the ejection cylinders.
- d. Release the locking- and the ejection-cylinder control levers when the ejection cylinders are retracted (Figure 052-226-1049-9).

## Performance Steps

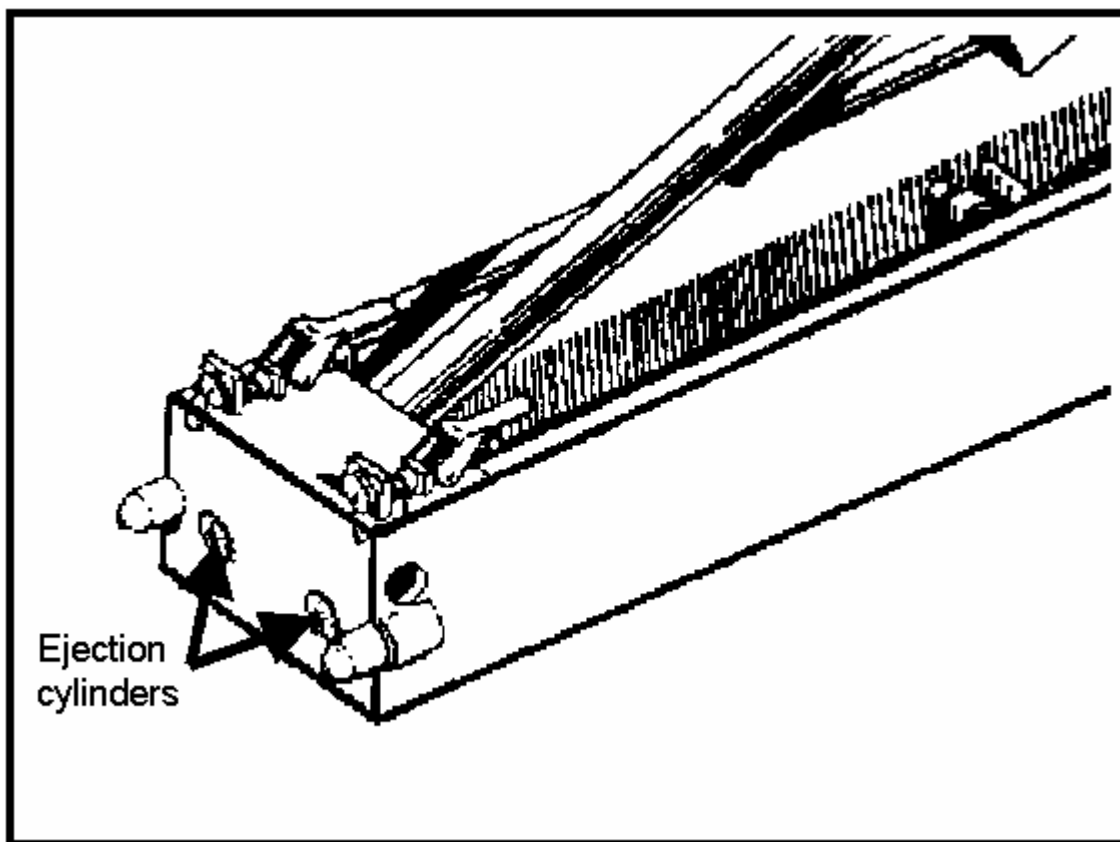


Figure 052-226-1049-9  
Ejection Cylinders

- e. Push down on the accelerator lock lever and the hydraulic-pump clutch lever.
  - f. Back the launcher away from the bridge.
8. Retract the outrigger assembly.
  - a. Pull up on the hydraulic-pump clutch lever to engage the hydraulic pump and lock the engine speed at 1,800 rpm.
  - b. Push down on the tongue-cylinder control lever until the tongue is fully retracted.
  - c. Push down on the overhead-cylinder control lever until the overhead cylinder is fully retracted.
  - d. Push down on the accelerator lock and the hydraulic-pump clutch lever.
  - e. Relieve the hydraulic pressure on all of the cylinders by moving each control lever up and down until no pressure is felt.
9. Reinstall the radio antenna.
10. Replace the dust plugs in the quick-disconnect couplings. This prevents dust and grime from entering the couplings (Figure 052-226-1049-10).

## Performance Steps

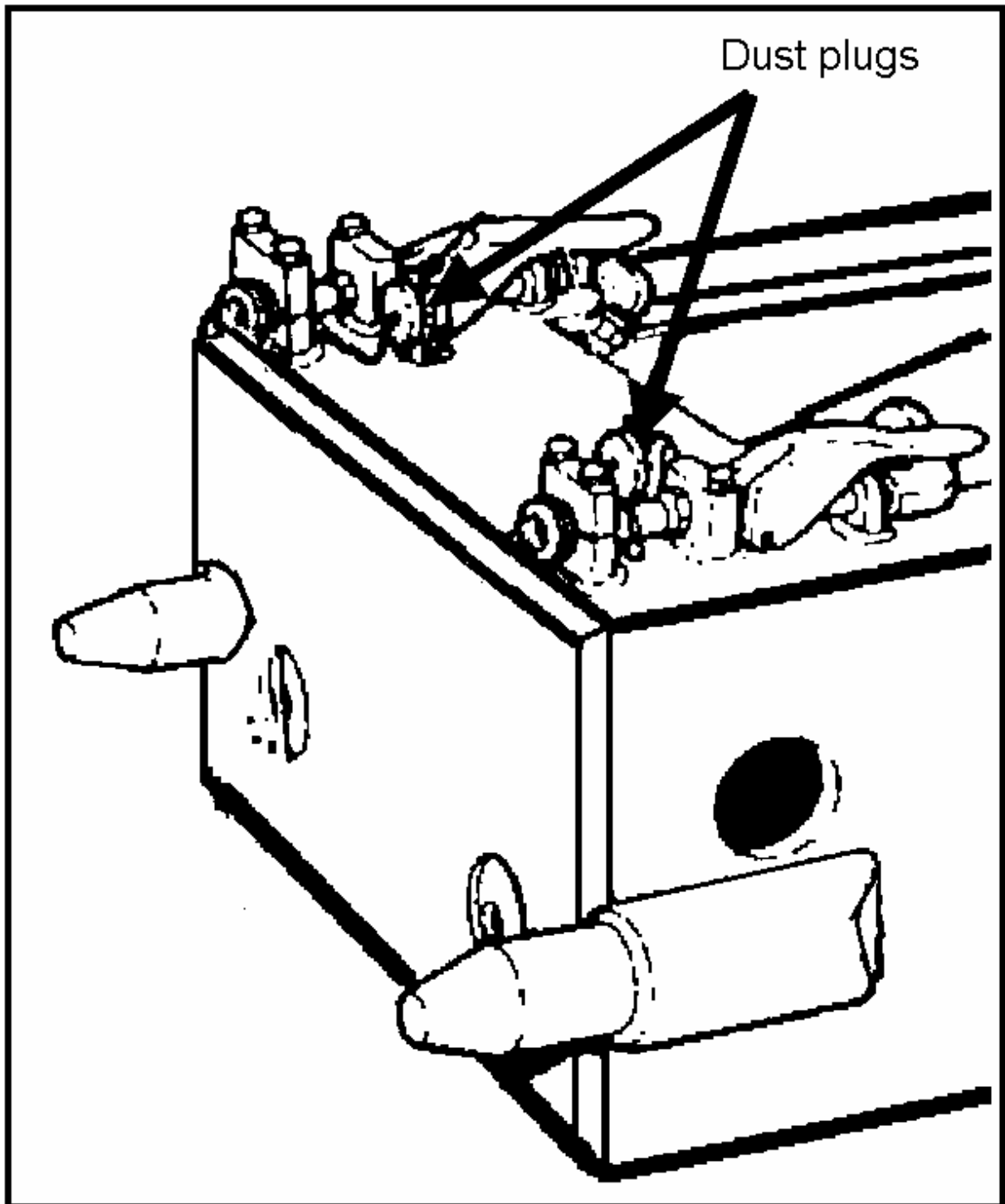


Figure 052-226-1049-10  
Dust Plug

NOTE: Insert the panel locking pins in the center of the bridge if the bridge is to be left in position for any length of time.

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions. If an actual gap is unavailable, create a simulated gap situation.

Brief soldier: Tell the soldier that he will be required to complete the performance measures according to the standards set forth in this task.

<b>Performance Measures</b>	<b><u>GO</u></b>	<b><u>NO GO</u></b>
1. Removed the radio antenna.	_____	_____
2. Started the AVL B.	_____	_____
3. Moved the AVL B to a position in line with the selected site.	_____	_____
4. Engaged the hydraulic pump.	_____	_____
5. Launched the bridge within 2 minutes of positioning the vehicle. Kept the far-shore end of the bridge no higher than 2 feet off of the ground, with a minimum of an 18-inch overhang with prepared abutments and a minimum of a 36-inch overhang with unprepared abutments.	_____	_____
6. Disconnected the bridge.	_____	_____
7. Performed additional procedures, as needed, to release the bridge from the launcher.	_____	_____
8. Retracted the outrigger assembly.	_____	_____
9. Reinstalled the radio antenna.	_____	_____
10. Replaced the dust plugs in the quick-disconnect couplings.	_____	_____

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

#### **References**

##### **Required**

##### **Related**

TM 5-5420-202-10

TM 5-5420-203-14

TM 5-5420-226-10

## Load the Bridge from an Armored-Vehicle-Launched Bridge (AVLB) onto a Trailer

### 052-226-1060

**Conditions:** As an AVLB operator in a field environment, given an AVLB (M48 or M60 tank chassis) with a completed before-operation preventive-maintenance checks and services (PMCS), a track commander (TC), a suitable loading area, and a trailer (a 40-ton flatbed or a goose neck, with wood, chains, and binder equipment) positioned in front of a loading ramp or a dugout.

**Standards:** Follow the TC's signals and instructions. Assist in loading and preparing the trailer to transport the bridge. Position the AVLB in line with the rear end of the trailer, launch the bridge onto the trailer, disconnect the vehicle from the bridge, and secure the bridge on the trailer. Avoid injury to personnel and equipment damage.

### Performance Steps

1. Position the tractor and trailer in front of the loading ramp or dugout, and lock the trailer's brakes. Prepare the trailer with timbers secured with a cable or a chain (Figure 052-226-1060-1).

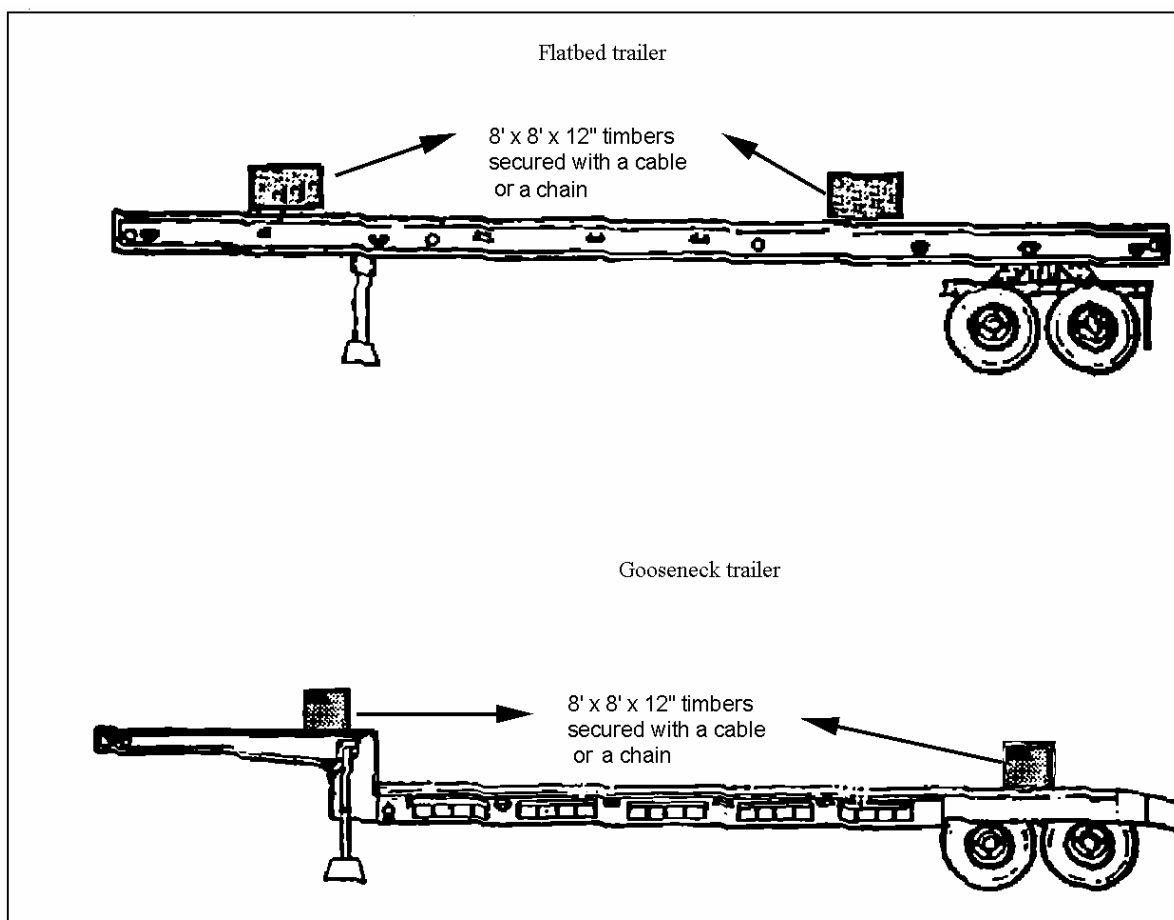


Figure 052-226-1060-1  
Preparing the Trailers for Loading

2. Secure the ramp ends of the bridge together with a chain or a cable secured with U bolts (Figure 052-226-1060-2). This will ensure that the bridge stays folded during the launching procedures.

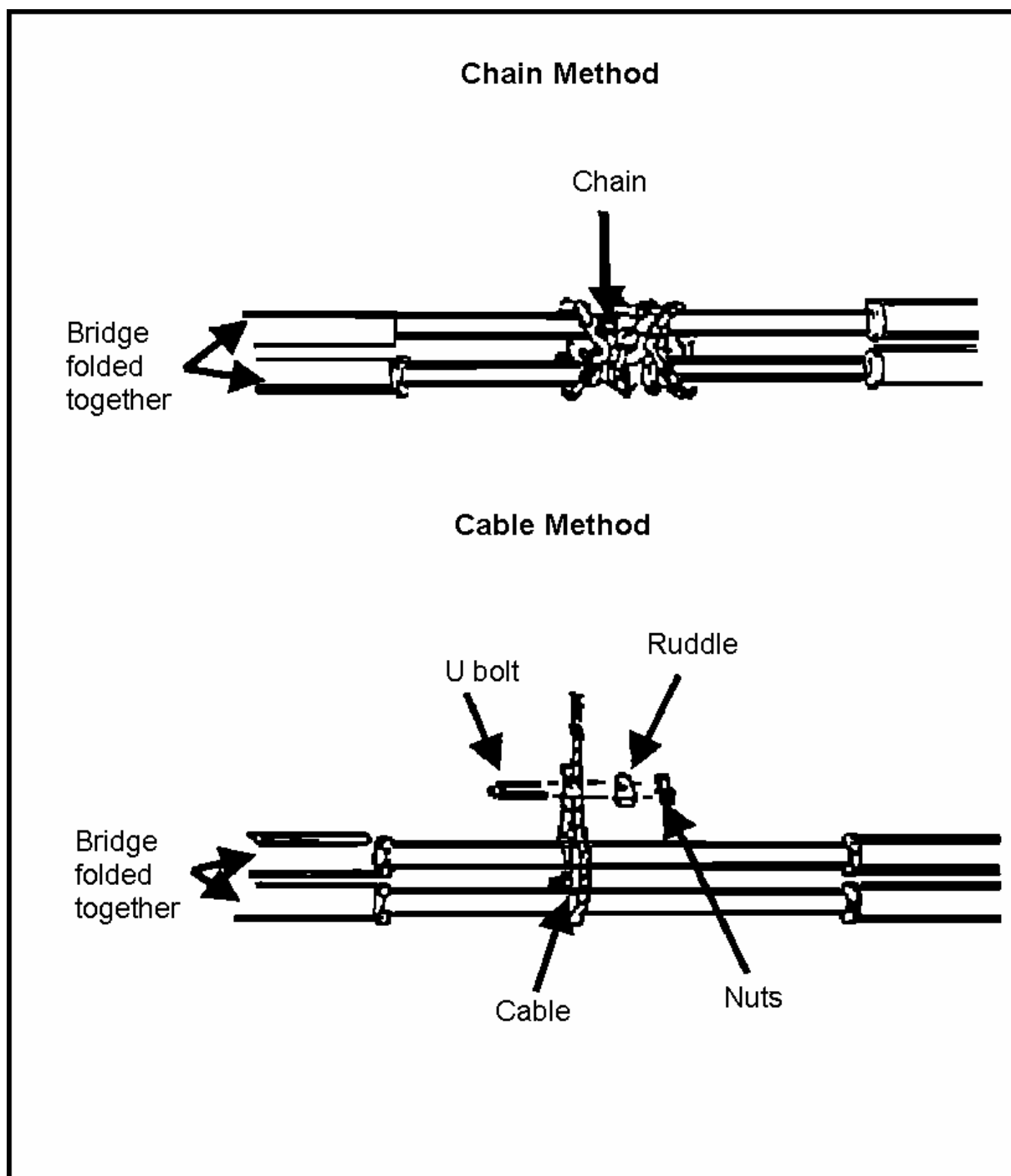
**Performance Steps**

Figure 052-226-1060-2  
Securing the Ramp Ends of the Bridge Together

3. Follow the signals given by the TC. Start the AVL B, and move it into position, centering the vehicle with the rear end of the trailer.

**Performance Steps**

CAUTION: LAUNCHING AND RETRIEVING PROCEDURES REQUIRE EXTENSIVE SKILL AND TECHNICAL KNOWLEDGE. ALL SIGNALS BETWEEN THE VEHICLE OPERATOR AND THE TC SHOULD BE REHEARSED BEFORE LOADING AND UNLOADING THE BRIDGE. THIS PROCEDURE SHOULD NOT BE PERFORMED BY AN INEXPERIENCED CREW.

4. Follow the signals given by the TC. Engage and hold the brakes, and raise the bridge into position. Lower the bridge onto the trailer using the outrigger and tongue cylinders.

NOTE: It may be necessary to raise and lower the bridge several times in order to achieve the proper placement on the trailer.

CAUTION: DO NOT ALLOW THE BRIDGE TO SLAM ON THE TRAILER.

5. Follow the signals given by the TC. Disconnect the AVL B from the bridge, retract the outrigger and the tongue cylinders, and shut off the vehicle's engine.
6. Follow the instructions given by the TC. Assist the truck operator and the TC in securing the bridge to the trailer (Figure 052-226-1060-3).



## Performance Steps

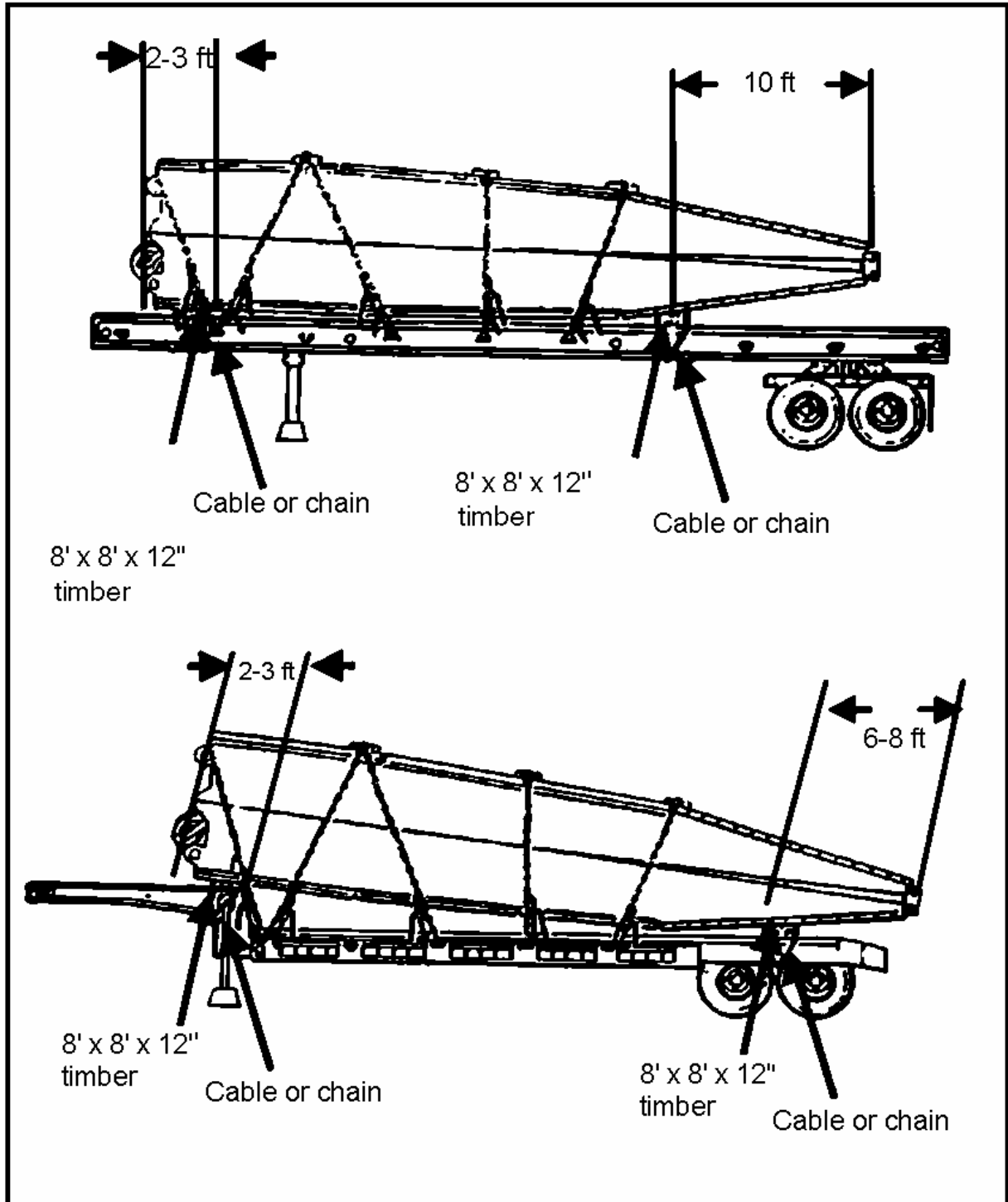


Figure 052-226-1060-3  
Securing the Bridge to the Trailer

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions.

Brief soldier: Tell the soldier that he will be required to complete the performance measures according to the standards set forth in this task.

<b>Performance Measures</b>	<b><u>GO</u></b>	<b><u>NO GO</u></b>
1. Positioned the tractor and trailer in front of the loading ramp or dugout, locked the trailer's brakes, and prepared the trailer by securing timbers to it using a cable or a chain.	—	—
2. Secured the ramp ends of the bridge together with a chain or a cable secured with U bolts.	—	—
3. Followed the signals given by the TC, started the AVLB's engine, and moved the vehicle into position, centering the vehicle with the rear end of the trailer.	—	—
4. Followed the signals given by the TC, engaged and held the brakes, raised the bridge into position, and lowered the bridge onto the trailer using the outrigger and the tongue cylinders.	—	—
5. Followed the signals given by the TC, disconnected the AVLB from the bridge, retracted the outrigger and the tongue cylinders, and shut off the vehicle's engine.	—	—
6. Followed the signals given by the TC and assisted in securing the bridge to the trailer.	—	—

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

#### **References**

##### **Required**

##### **Related**

TM 5-5420-202-10

TM 5-5420-203-14

TM 5-5420-226-10

## Unload a Bridge from a Trailer to an Armored Vehicle Launcher

**052-226-1061**

**Conditions:** As an armored-vehicle-launched bridge (AVLB) operator in a field environment, given an AVLB (M48 or M60 tank chassis) with a completed before-operation preventive-maintenance checks and services (PMCS), a track commander (TC), a suitable loading area, a trailer (40-ton flatbed or goose neck) positioned in front of an off-loading ramp or a dugout, and a bridge (scissoring, with a 60-foot span) secured to a trailer with chain and binder equipment.

**Standards:** Follow the signals and instructions given by the TC. Assist in unsecuring the bridge from the trailer, positioning the vehicle in line with the rear end of the trailer, positioning the tongue and outrigger assembly, connecting to the bridge, extending the locking pins, and retrieving the bridge. Avoid injury to personnel and equipment damage.

### Performance Steps

1. Follow the instructions given by the TC. Remove the chain and binder equipment securing the bridge to the trailer.

**WARNING:** THE BINDERS ARE UNDER TENSION. DO NOT STAND IN FRONT OF THEM DURING REMOVAL.

**WARNING:** IF THE BRIDGE BEGINS TO SLIP OR SLIDE DURING THE REMOVAL OF THE BINDER EQUIPMENT, MOVE AWAY FROM THE BRIDGE.

**DANGER:** DO NOT ATTEMPT TO UNLOAD A BRIDGE FROM A TRAILER POSITIONED ON A SLOPE, AS THE BRIDGE MAY SLIDE OFF OF THE TRAILER AND CAUSE DEATH OR SEVERE INJURY TO PERSONNEL.

2. Ensure that the bridge's ramp ends are secured together with a chain or a cable with U bolts.  
**CAUTION:** BRIDGE LAUNCHING AND RETRIEVAL PROCEDURES REQUIRE EXTENSIVE SKILL AND TECHNICAL KNOWLEDGE. ALL SIGNALS SHOULD BE REHEARSED BEFORE LOADING AND UNLOADING THE BRIDGE. THIS PROCEDURE SHOULD NOT BE PERFORMED BY AN INEXPERIENCED CREW.

3. Follow the signals given by the TC. Position the vehicle in line with the rear end of the trailer.
4. Follow the signals given by the TC. Extend the overhead cylinder and position the tongue assembly in line with the bridge's diaphragm.
5. Follow the signals given by the TC. Move the vehicle forward until the tongue is seated properly on the bridge.
6. Follow the signals given by the TC. Extend the bridge's lock pins.

**NOTE:** The TC will ensure the bridge's lock pins are fully extended.

7. Follow the signals given by the TC. Place the vehicle's transmission in park, and bleed the hydraulic system.

**NOTE:** The TC will connect the hydraulic lines.

8. Follow the signals given by the TC. Retract the tongue cylinder until the bridge is in a full-upright position.
9. Reduce the vehicle's engine speed to an idle, and observe the TC as he removes the chain from the bridge's ramp ends.

**DANGER:** DO NOT TOUCH ANY LEVERS UNTIL THE TC IS VISIBLE AND CLEAR OF THE BRIDGE.

10. Follow the signals given by the TC. Retract the overhead cylinder until the bridge is seated on the vehicle's back deck.

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions.

Brief soldier: Tell the soldier to follow the signals and instructions given by the TC. The evaluation will be based on the overall performance of the task.

<b>Performance Measures</b>	<b><u>GO</u></b>	<b><u>NO GO</u></b>
1. Followed the instructions given by the TC and assisted in removing the chain and the binder equipment.	—	—
2. Ensured that the bridge's ramp ends were secured together with a chain or a cable with U bolts.	—	—
3. Followed the signals given by the TC. Positioned the vehicle in line with the rear end of the trailer.	—	—
4. Followed the signals given by the TC. Extended the overhead cylinder, and positioned the tongue assembly in line with the bridge's diaphragm.	—	—
5. Followed the signals given by the TC. Moved the vehicle forward until the tongue was seated properly on the bridge.	—	—
6. Followed the signals given by the TC. Extended the bridge's lock pins.	—	—
7. Followed the signals given by the TC. Placed the vehicle's transmission in park, and bleed the hydraulic system.	—	—
8. Followed the signals given by the TC. Retracted the tongue cylinder until the bridge was in a full-upright position.	—	—
9. Reduced the vehicle's engine speed to an idle and observed the TC as he removed the chain from the bridge's ramp ends.	—	—
10. Followed the signals given by the TC. Retracted the overhead cylinder until the bridge was seated on the vehicle's back deck.	—	—

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

#### **References Required**

**Related**  
TM 5-5420-202-10  
TM 5-5420-203-14  
TM 5-5420-226-10

**Operate the Winch of an Armored Combat Earthmover (ACE), M9**  
**052-227-1103**

**Conditions:** As an ACE operator in a field environment, given an ACE, basic-issue items (BIIs), leather gloves, an object to be winched, an object to be used as an anchor, and an assistant.

**Standards:** Perform winching operations using the ACE. Pay in the cable using a lighter vehicle or another heavy object. Avoid injury to personnel and equipment damage.

**Performance Steps**

1. Start the ACE's engine, and allow it to warm-up for 3 to 5 minutes.
2. Position the vehicle so that the winch is directly in front of the object to be winched.  
NOTE: The assistant uses hand-and-arm signals to assist the operator in positioning the vehicle.
3. Place the winch shift lever in the HIGH position (handle down) (Figure 052-227-1103-1).

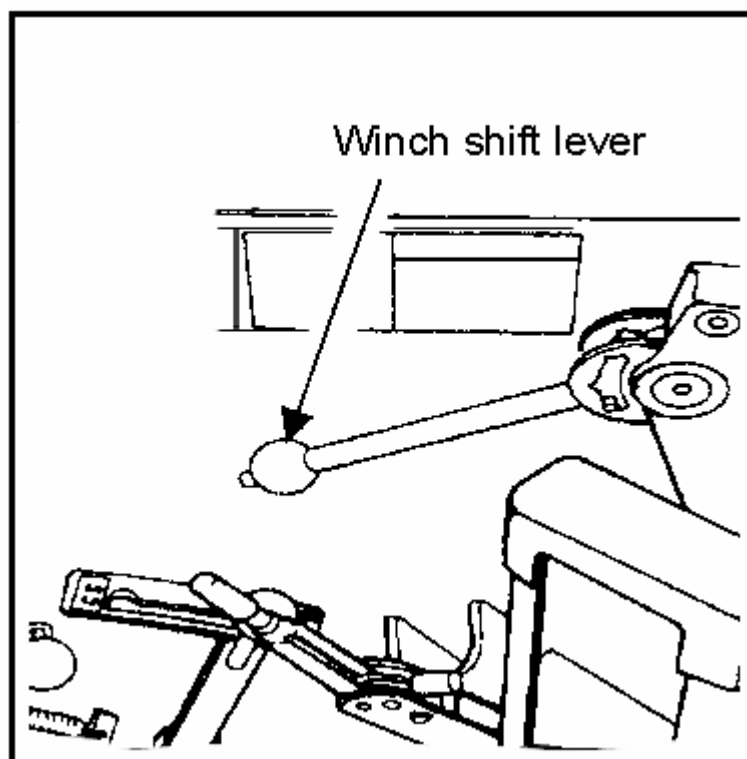


Figure 052-227-1103-1  
Winch Shift Lever in the HIGH Position

4. Move the winch stop away from the winch control lever, and move the winch control lever to the OUT position. Pay out about 2 feet of cable or until the assistant gives the signal to stop (Figure 052-227-1103-2).

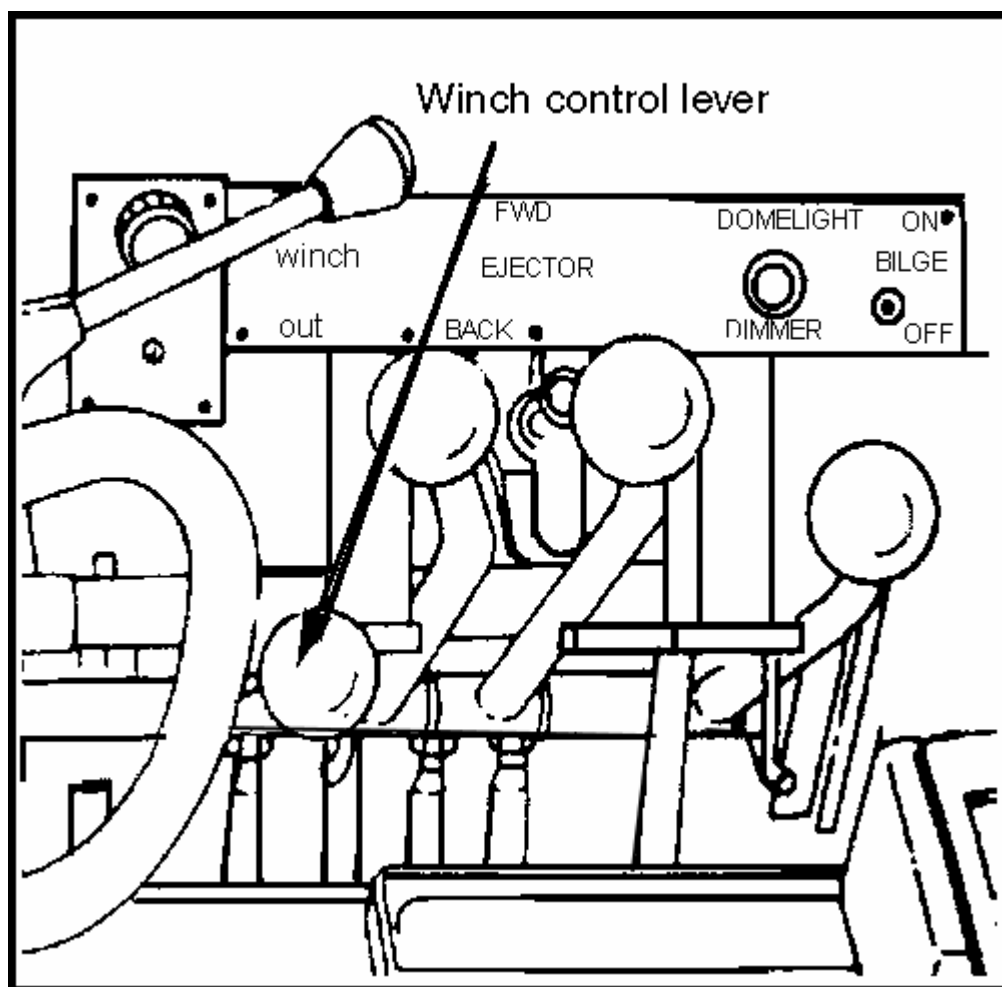
**Performance Steps**

Figure 052-227-1103-2  
Winch Control Lever

**WARNING:** ALWAYS WEAR LEATHER GLOVES WHEN HANDLING WIRE ROPE. NEVER ALLOW THE ROPE TO RUN THROUGH YOUR HANDS. DURING WINCHING OPERATIONS, DO NOT ALLOW THE WINCH DRUM TO REDUCE TO LESS THAN FOUR RAPS OF CABLE. ENSURE THAT ALL PERSONNEL STAND CLEAR OF THE WIRE ROPE DURING WINCHING OPERATIONS.

5. Instruct the assistant to lift the cable hook from the hull bracket. Follow the signals given by the assistant, and hold the winch control lever in the OUT position until the assistant has enough cable to connect it to the object (Figure 052-227-1103-3).

## Performance Steps

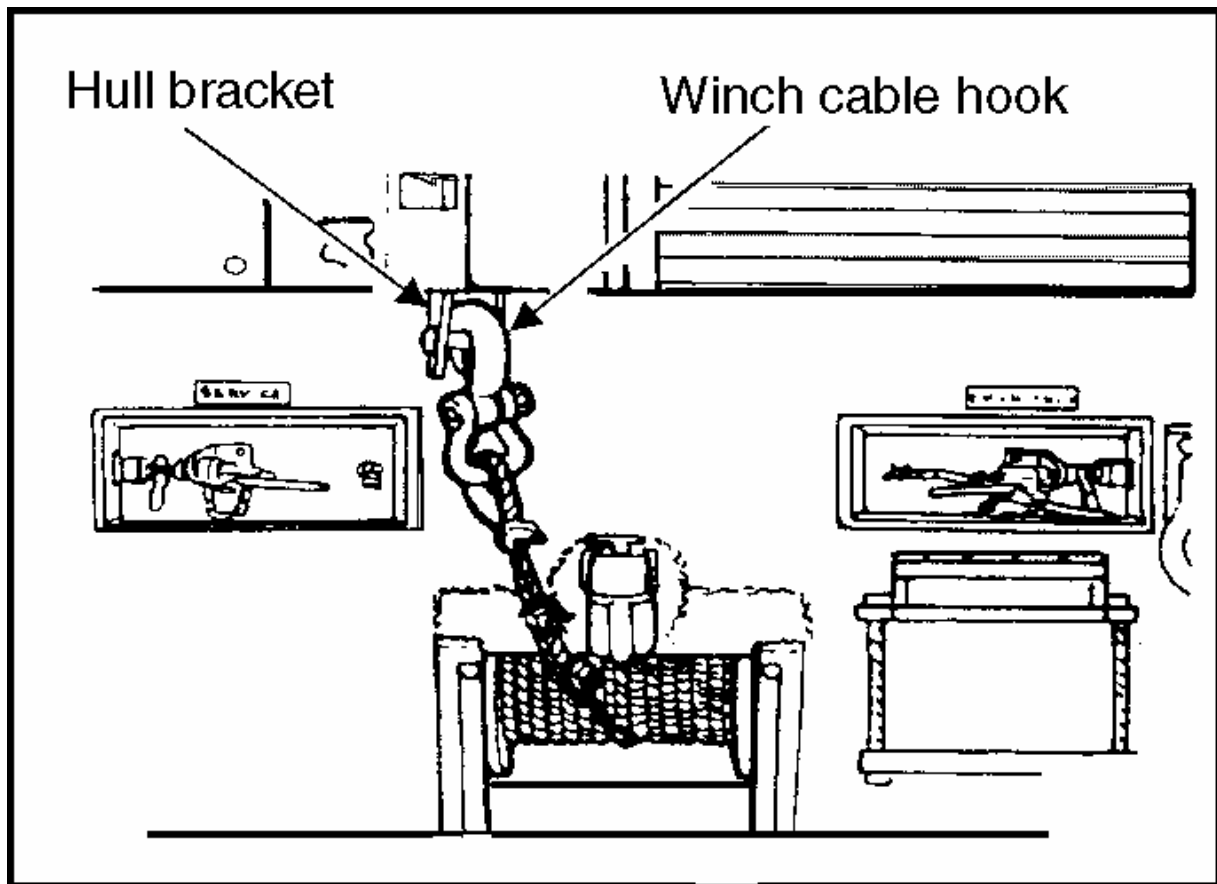


Figure 052-227-1103-3  
Hull Bracket

6. Place the winch shift lever in the LOW position (handle up) (Figure 052-227-1103-4).

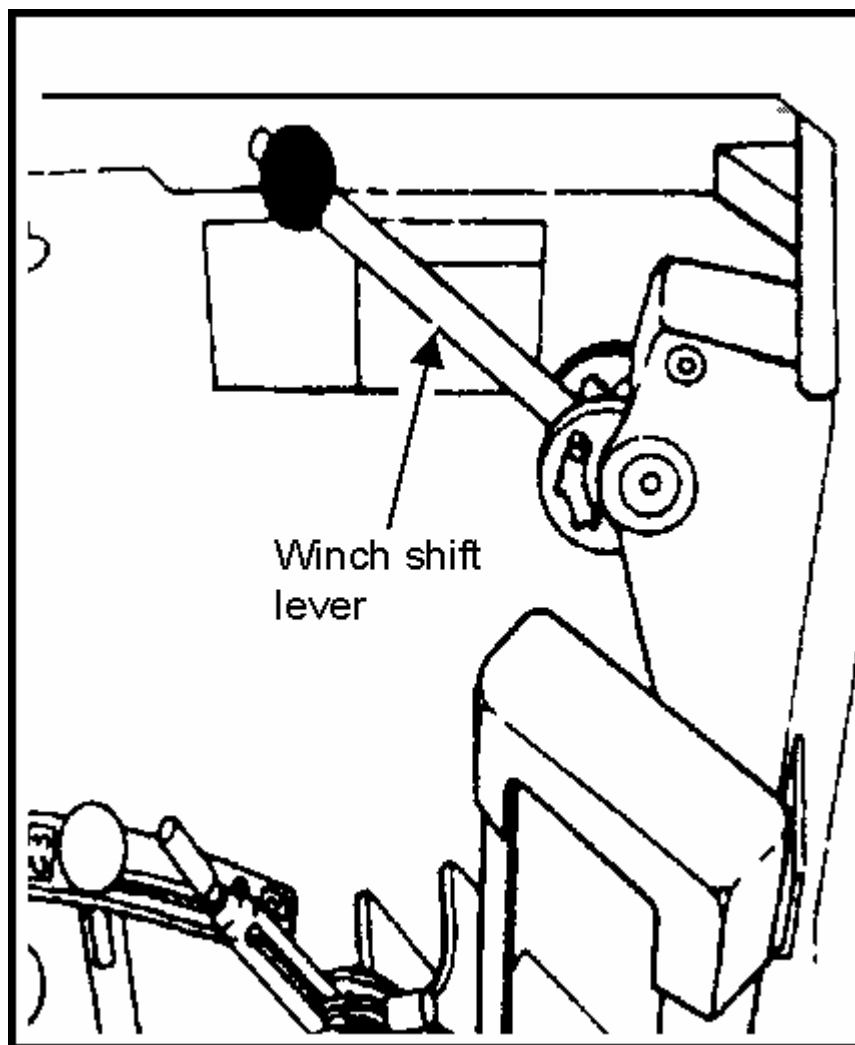
**Performance Steps**

Figure 052-227-1103-4  
Winch Shift Lever in the LOW Position

NOTE: Do not perform winching operations with the ACE's engine in HIGH gear.

7. Follow the signals given by the assistant. Move the winch control lever to the IN position, and winch the object to the desired position.

NOTE: The assistant removes the cable from the object.

8. Pay in the cable using a lighter vehicle.
  - a. Instruct the assistant to stretch out the cable, and attach it to the lighter vehicle (Figure 052-227-1103-5).



## Performance Steps

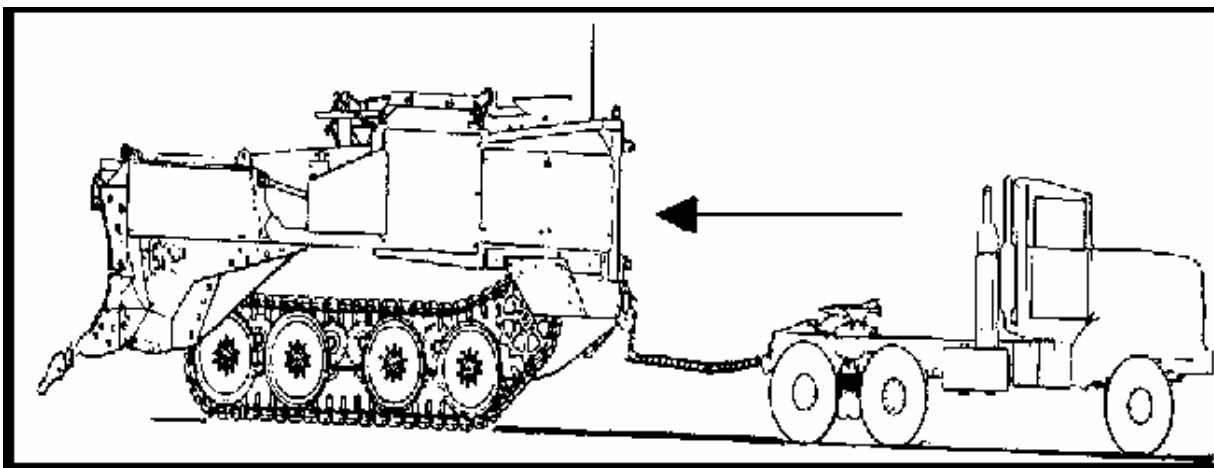


Figure 052-227-1103-5  
Attaching the Cables to a Lighter Vehicle

- b. Set the ACE's parking brake.
- c. Instruct the assistant to ensure that the lighter vehicle's transmission is in the NEUTRAL position.

**WARNING: THE LIGHTER VEHICLE SHOULD HAVE AN OPERATOR INSIDE OF THE VEHICLE TO OPERATE THE STEERING AND THE BRAKES.**

- d. Move the winch shift lever to the LOW position.
- e. Operate the winch control lever and pull in all but 3 feet of the cable or until the assistant signals you to stop.

**NOTE:** The assistant ensures that the cable rows on the drum are straight and tight, not overlapped, and are properly spaced or loose.

**NOTE:** The assistant disconnects the cable hook from the lighter vehicle and attaches it to the hull bracket.

- f. Follow the signals given by the assistant. Pull the cable in until the slack is taken up.
  - g. Engage the winch stop to the winch control lever.
9. Pay in the cable without the use of a lighter vehicle.
- a. Instruct the assistant to stretch out the cable, and attach it to a suitable anchor, such as a tree or another heavy vehicle (Figure 052-227-1103-6).

## Performance Steps

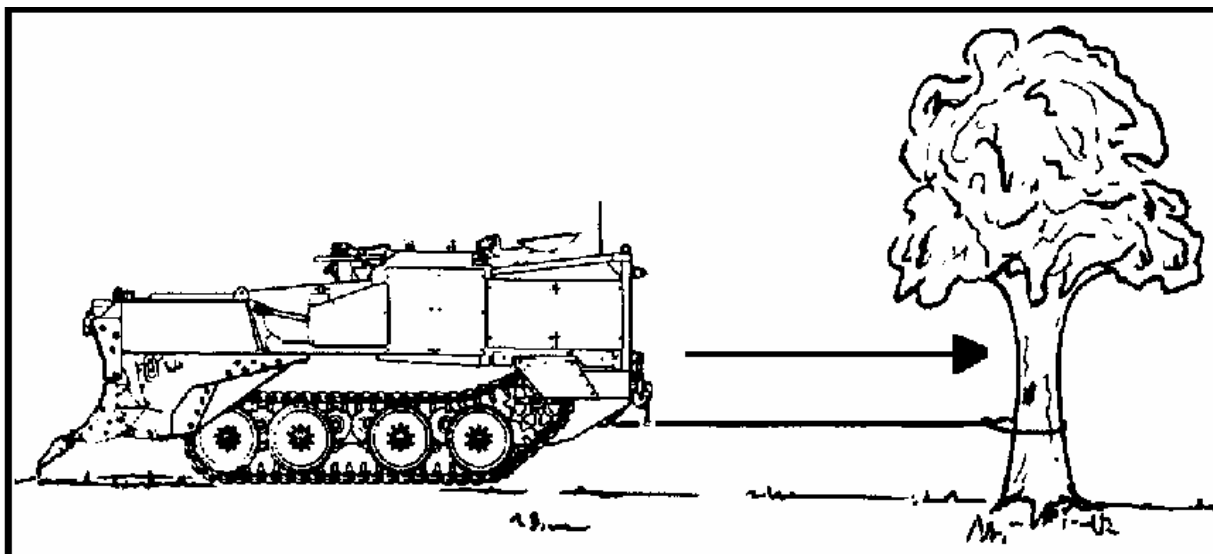


Figure 052-227-1103-6  
Attaching the Cables to an Anchor

- b. Place the ACE's transmission shift lever in the NEUTRAL position and the steering selector in the gear steer (GS) position.
- c. Place the winch shift selector in the LOW position.
- d. Operate the winch control lever, and pull in all but 3 feet of the cable or until the assistant gives you the signal to stop.

NOTE: As the cable feeds onto the drum, the cable pulls the ACE backward.

NOTE: The assistant ensures that the cable rows on the drum are straight and tight, not overlapped, and are properly spaced or loose.

NOTE: The assistant disconnects the cable hook from the anchor and attaches it to the hull bracket.

- e. Follow the signals given by the assistant. Pull in the cable until the slack is removed.
- f. Engage the winch stop to the winch control lever.

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions. Ensure that the vehicle operator understands that the assistant is there to assist in the overall completion of the task and to ensure equipment and personnel safety. The operator and the assistant must communicate with each other using hand-and-arm signals when moving the vehicle and operating the winch. Hand-and-arm signals between the operator and the assistant should be rehearsed before beginning the task.

**Brief soldier:** Tell the soldier that he will be required to complete the performance measures according to the standards set forth in this task.

### Performance Measures

	<u>GO</u>	<u>NO GO</u>
1. Started the ACE's engine and allowed it to warm-up for 3 to 5 minutes.	—	—
2. Positioned the vehicle so that the winch was directly in front of the object to be winched.	—	—
3. Placed the winch shift lever in the HIGH position (handle down). Moved the winch stop away from the winch control lever and moved the winch control lever to the OUT position. Payed out approximately 2 feet of cable or until the assistant gave the signal to stop.	—	—

**Performance Measures**

	<b><u>GO</u></b>	<b><u>NO GO</u></b>
4. Instructed the assistant to lift the cable hook from the hull bracket. Followed the signals given by the assistant and held the winch control lever in the OUT position until the assistant had enough cable to connect it to the object.	_____	_____
5. Placed the winch shift lever in the LOW position (handle up), followed the signals given by the assistant, moved the winch control lever to the IN position, and winched the object to the desired location.	_____	_____
6. Payed in the cable using a lighter vehicle.	_____	_____
7. Payed in the cable without the use of a lighter vehicle.	_____	_____

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

**References****Required****Related**

TM 5-2350-262-10

**Operate a Fixed Fire Extinguisher on an Armored Combat Earthmover (ACE), M9**  
**052-227-1106**

**Conditions:** As a ACE operator in a field environment, given an ACE (moving or stationary) with a completed before-operation preventive-maintenance checks and services (PMCS). The vehicle's engine is running. There is a fire in the engine compartment.

**Standards:** Extinguish the fire using the ACE's interior or exterior fixed fire-extinguisher handles or the portable fire extinguisher. Minimized the damage to the vehicle and avoided injury to personnel.

**Performance Steps**

1. Stop the vehicle (if moving) and turn off the engine and the master battery.  
NOTE: The vehicle must be stopped for the extinguisher agent to be effective.
2. Extinguish the fire in the engine compartment. When seated in the operator's seat, pull hard on the internal fixed fire-extinguisher handle, remove the portable fire extinguisher, and exit the vehicle and move a safe distance (Figure 052-227-1106-1).

## Performance Steps

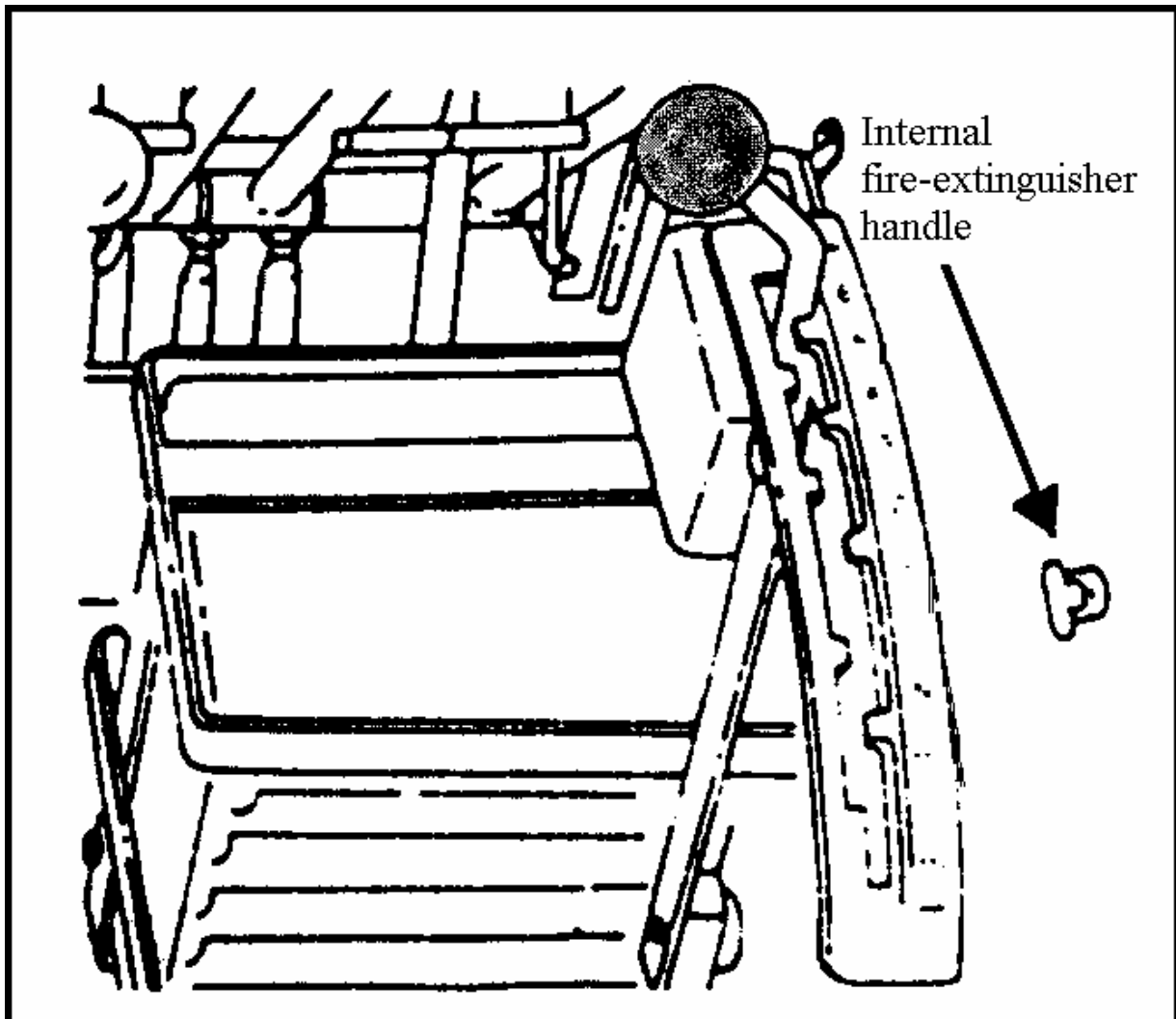


Figure 052-227-1106-1  
Internal Fire-Extinguisher Handle

3. Extinguish the fire in the engine compartment. When outside of the vehicle, pull the external fixed fire-extinguisher handle, and move a safe distance from the vehicle (Figure 052-227-1106-2).

## Performance Steps

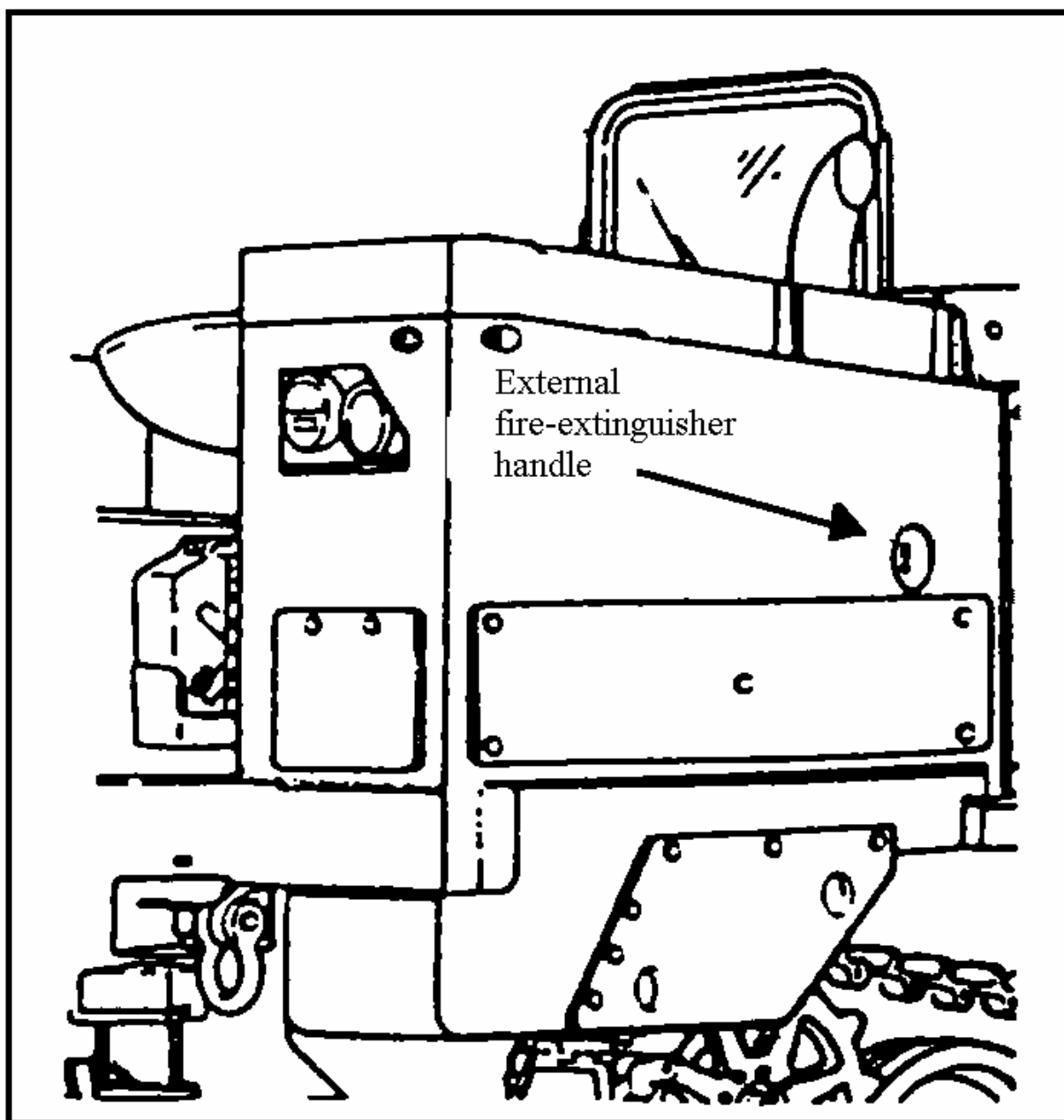


Figure 052-227-1106-2  
External Fire-Extinguisher Handle

**WARNING:** DO NOT INHALE THE FIRE EXTINGUISHER AGENT, AS IT MAY IRRITATE THE EYES AND THE THROAT AND CAUSE DIZZINESS OR FAINTING.

4. Extinguish the fire (interior or exterior) using the portable fire extinguisher.

**NOTE:** The portable fire extinguisher is used to extinguish smoldering or small fires, such as electrical fires in the operator's compartment or exterior fires outside of the vehicle caused by larger blazes.

a. Remove the portable fire extinguisher from the bracket near the operator's seat (Figure 052-227-1106-3).

## Performance Steps

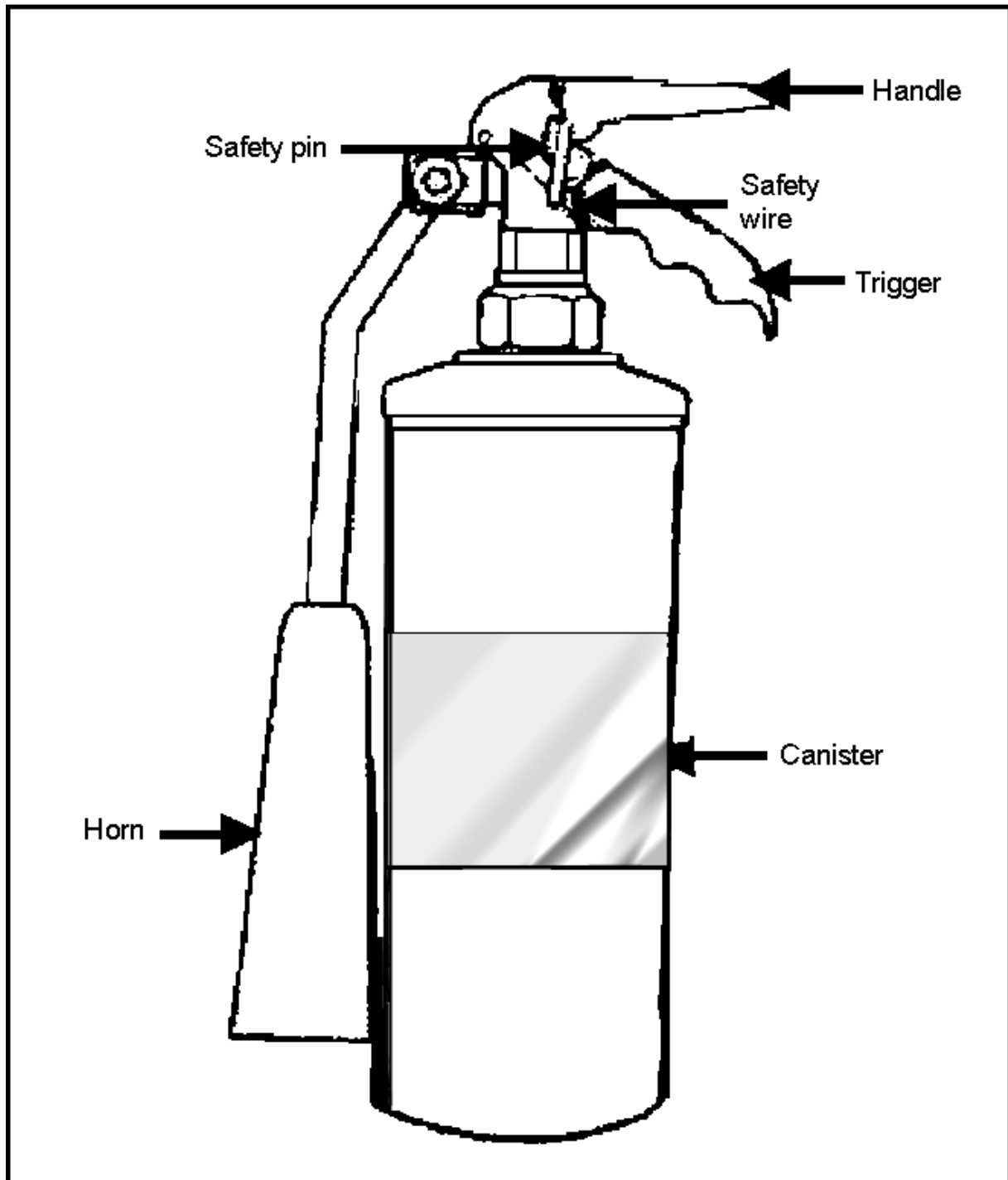


Figure 052-227-1106-3  
Portable Fire Extinguisher

- b. Break the safety wire and pull out the safety pin.
- c. Pull up on the horn-shaped nozzle until it is level.
- d. Approach the fire as close as safely possible, and aim the fire extinguisher's nozzle directly at the base of the flames.

**Performance Steps**

**WARNING:** AVOID CONTACT WITH THE FIRE EXTINGUISHER AGENT, AS IT MAY IRRITATE THE EYES AND THROAT AND CAUSE DIZZINESS AND FAINTING.

**WARNING:** APPROACH AN EXTERIOR FIRE WITH THE WIND AT YOUR BACK. FAILURE TO DO SO COULD RESULT IN SEVERE BURNS.

e. Press down and hold the fire extinguisher's trigger, and release the agent.

**NOTE:** After extinguishing an interior vehicle fire, open all of the hatches, and let the vehicle air out for five minutes before resuming operations.

f. Place the pin back in the trigger.

g. Turn the nozzle down.

h. Tag the fire extinguisher EMPTY.

i. Replace the empty fire extinguisher as soon as possible.

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions. The evaluator determines if the vehicle is moving or stationary and if the fire is interior or exterior.

Brief soldier: Ensure that the soldier understands that the fire is simulated for training purposes and that he should not activate the internal, external, or portable fire extinguishers.

**Performance Measures**

	<b><u>GO</u></b>	<b><u>NO GO</u></b>
1. Stopped the vehicle and turned off the engine and the master battery.	—	—
2. Extinguished the fire in the engine compartment using the interior fixed fire-extinguisher handle.	—	—
3. Extinguished the fire in the engine compartment using the exterior fixed fire-extinguisher handle.	—	—
4. Extinguished the vehicle fire using the portable fire extinguisher.	—	—

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

**References****Required****Related**

TM 5-2350-262-10



**Fold the Blade of an Armored Combat Earthmover (ACE), M9**  
**052-227-1111**

**Conditions:** As an ACE operator in a field environment, given an ACE, with an empty bowl and an unfolded blade; basic-issue items (BIIs); a completed before-operation preventive-maintenance checks and services (PMCS); and an assistant.

**Standards:** Fold the ACE's blade without causing injury to personnel or equipment damage.

**Performance Steps**

1. Remove the shovel and the chain from the apron stowage.
2. Start the ACE's engine and allow it to warm-up for 3 to 5 minutes.
3. Place the suspension control lever in the SPRUNG position (Figure 052-227-1111-1).

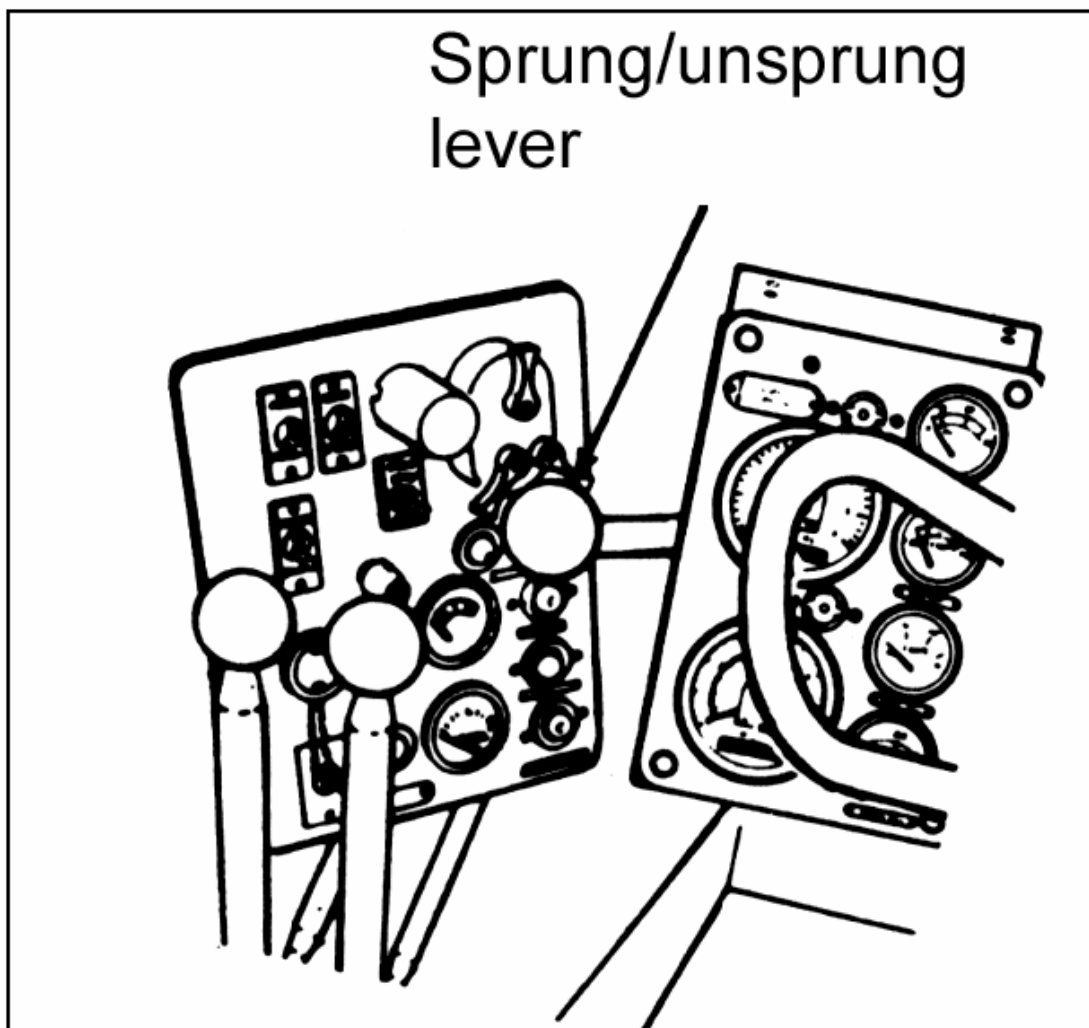


Figure 052-227-1111-1  
Suspension Control Levers

**Performance Steps**

4. Move the ejector stop away from the ejector control lever. Move the ejector forward 2 feet or until the assistant gives the signal to stop (Figure 052-227-1111-2).

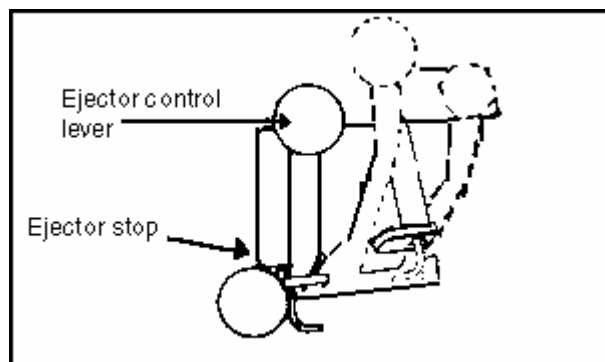


Figure 052-227-1111-2  
Ejector Control Lever

**WARNING:** DO NOT OPERATE THE EJECTOR WHEN PERSONNEL ARE IN THE BOWL, UNLESS THE EJECTOR LOCK IS ENGAGED. SEVERE INJURY TO PERSONNEL MAY RESULT.

**WARNING:** DO NOT WORK UNDER THE VEHICLE UNLESS THE HULL IS BLOCKED AND THE APRON LOCK PINS ARE INSTALLED. SEVERE INJURY TO PERSONNEL MAY RESULT.

5. Push the apron control lever forward, and raise the apron to the full open position (Figure 052-227-1111-3)

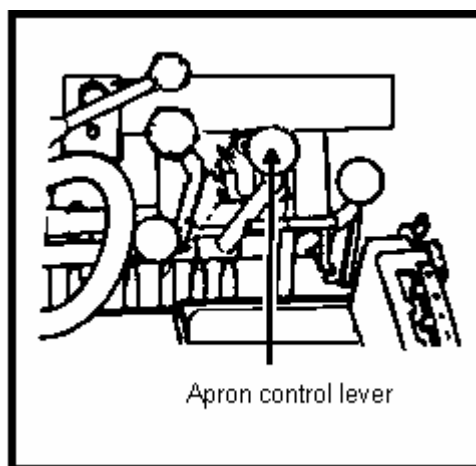


Figure 052-227-1111-3  
Apron Control Lever

6. Install the apron lock pins (Figure 052-227-1111-4).

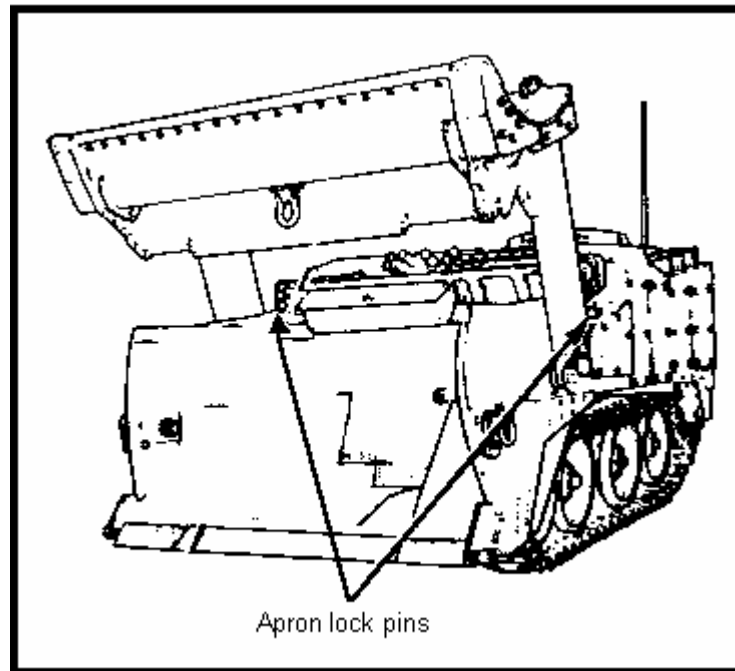
**Performance Steps**

Figure 052-227-1111-4  
Apron Lock Pins

7. Thread no less than ten links of chain through the shackle on the backside of the dozer blade, and secure the chain with the hook (Figure 052-227-1111-5).

## Performance Steps

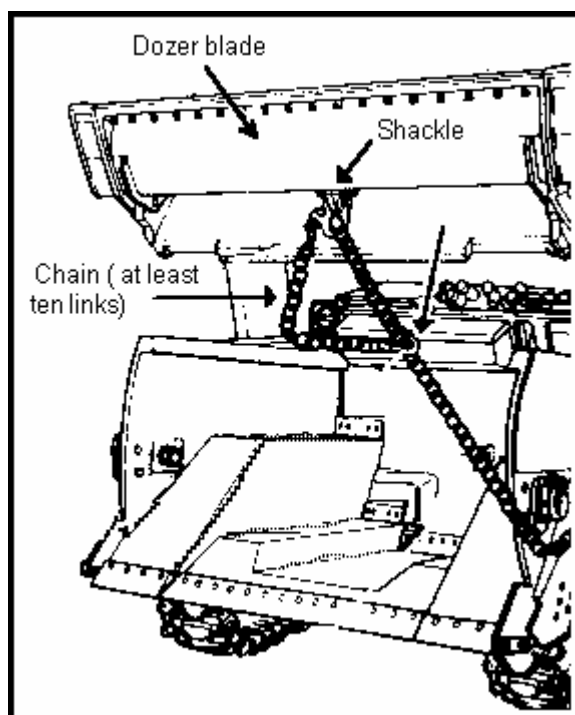


Figure 052-227-1111-5  
Threading Ten Links

8. Adjust the chain length until the free end of the chain just reaches the last screw of the forward-track retainer, with the chain against the bottom of the apron-lock-pin stowage bracket and the tie-down shackle (Figure 052-227-1111-6).

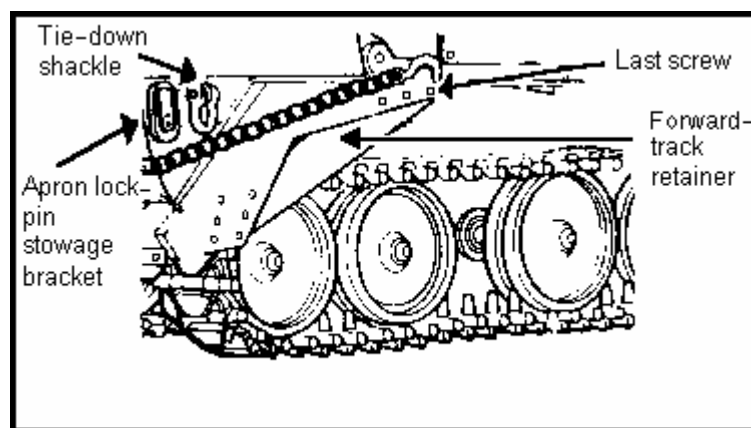


Figure 052-227-1111-6  
Adjusting the Chain Length

9. Place the free end of the chain on the ground in front of the vehicle.
10. Remove the apron lock pins, and lower the apron.
11. Feed the chain over the top of the apron, and attach it to the lifting eye on the front of the ejector (Figure 052-227-1111-7).

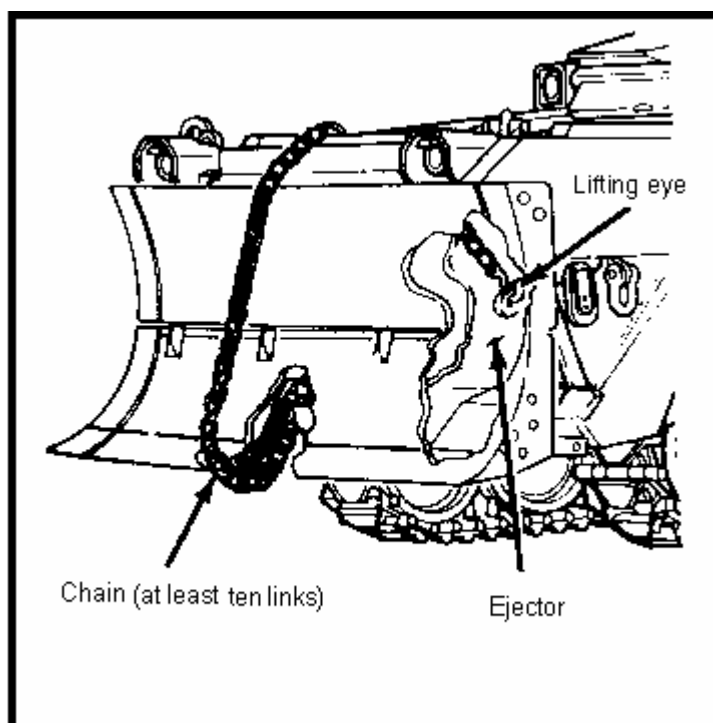
**Performance Steps**

Figure 052-227-1111-7  
Feeding the Chain Over the Blade

12. Instruct the assistant to help with the following tasks:
  - a. Remove the screw, the nut, and the dozer-blade latch from each side of the apron (Figure 052-227-1111-8).
  - b. Remove the two clips, and drive through or pull out the two dozer lock pins (Figure 052-227-1111-8).

## Performance Steps

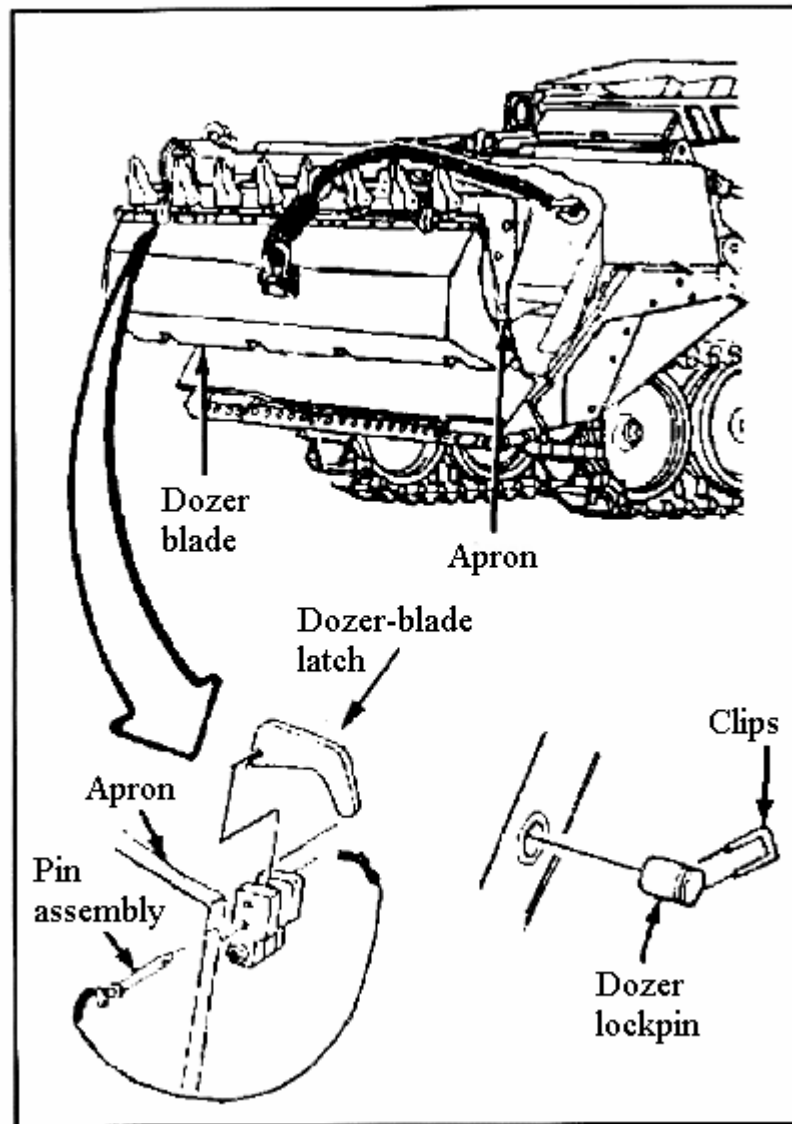


Figure 052-227-1111-8  
Removing the Dozer Lock Pins

13. Retract the ejector until the dozer blade is folded against the apron (Figure 052-227-1111-9).

## Performance Steps

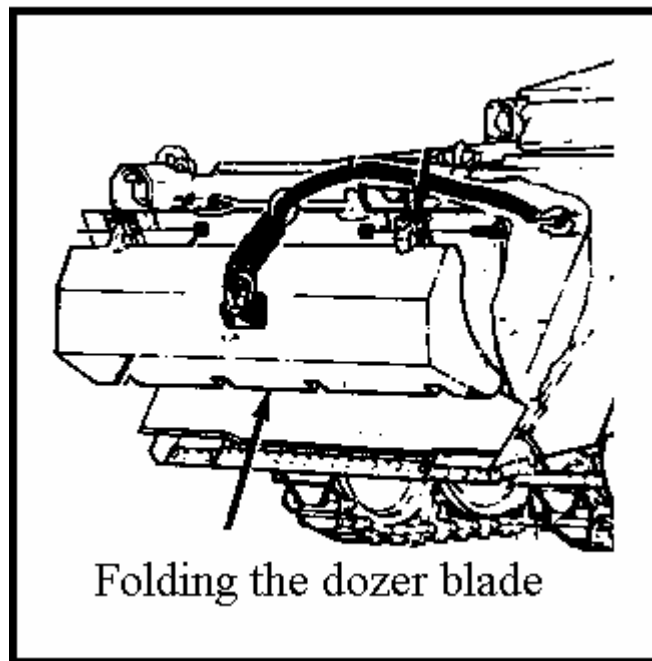


Figure 052-227-1111-9  
Folding the Dozer Blade

14. Instruct the assistant to aid in securing the dozer blade. Reinstall the latch, and place a screw and a nut on each side of the apron.
15. Release the tension on the chain by pinching the ejector forward.
16. Remove the chain from the dozer blade and the ejector.
17. Instruct the assistant to aid in reinstalling the two dozer lock pins in the dozer blade. Secure the pins with the two clips.
18. Stow the chain and the shovel in the apron stowage.

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions.

Brief soldier: Tell the soldier that the evaluation will be based on the overall performance of the task. The assistant is only to assist when instructed to do so and can only perform the steps covered in the training information outline.

## Performance Measures

	<u>GO</u>	<u>NO GO</u>
1. Removed the shovel and the chain from the apron stowage.	—	—
2. Started the ACE's engine and allowed it to warm-up for 3 to 5 minutes.	—	—
3. Placed the suspension control lever in the SPRUNG position.	—	—
4. Moved the ejector stop away from the ejector control lever. Moved the ejector forward 2 feet or until the assistant gave the signal to stop.	—	—
5. Raised the apron to the full-open position and installed the apron lock pins.	—	—

**Performance Measures**

	<b><u>GO</u></b>	<b><u>NO GO</u></b>
6. Threaded no less than ten links of the chain through the shackle on the back side of the dozer blade. Secured the chain with the hook, adjusted the chain length, and placed the chain's free end on the ground in front of the vehicle.	_____	_____
7. Removed the apron lock pins and lowered the apron.	_____	_____
8. Feed the chain over the top of the apron and attached it to the lifting eye.	_____	_____
9. Removed the screw, the nut, and the dozer-blade latch from each side of the apron. Removed the two clips and drove through or pulled out the two dozer lock pins.	_____	_____
10. Retracted the ejector until the dozer blade was folded and secured the blade with the latches.	_____	_____
11. Released the tension on the chain by inching the ejector forward. Removed the chain from the dozer blade and the ejector.	_____	_____
12. Reinstalled the dozer lock pins.	_____	_____
13. Stowed the chain and the shovel in the apron stowage.	_____	_____

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

**References****Required****Related**

TM 5-2350-262-10



**Perform Dozing Operations with an Armored Combat Earthmover (ACE), M9****052-227-1200**

**Conditions:** As an ACE operator in a field environment, given an ACE, with a full bowl of ballast and an unfolded blade; a completed before-operation preventive-maintenance checks and services (PMCS); basic-issue items (BIs); and an approved digging area.

**Standards:** Perform straight-dozing and tilt-dozing operations, with minimal washboard effect. Avoid injury to personnel and equipment damage.

**Performance Steps**

1. Start the ACE's engine and allow it to warm-up for 3 to 5 minutes.
2. Ensure that the bowl is full of ballast.
3. Raise and lower the apron several times to ensure that the apron makes full contact with the hull.  
NOTE: Raising the apron too high may cause the ballast to fall from the bowl.
4. Place the suspension control lever in the UNSPRUNG position (Figure 052-227-1200-1).

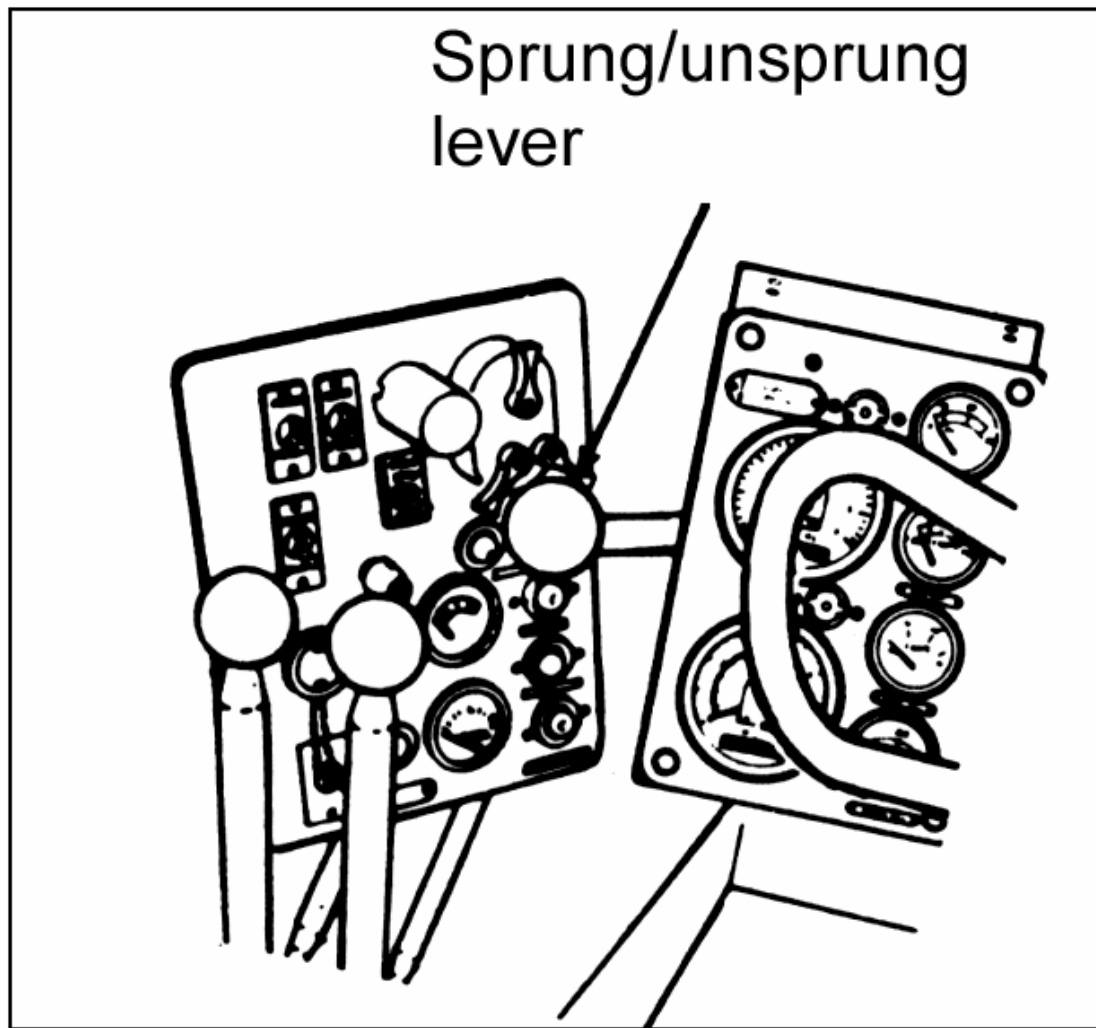
**Performance Steps**

Figure 052-227-1200-1  
Suspension Control Levers

5. Move the left- and the right-suspension control levers forward until the scraper blade rests on the ground (Figure 052-227-1200-2).

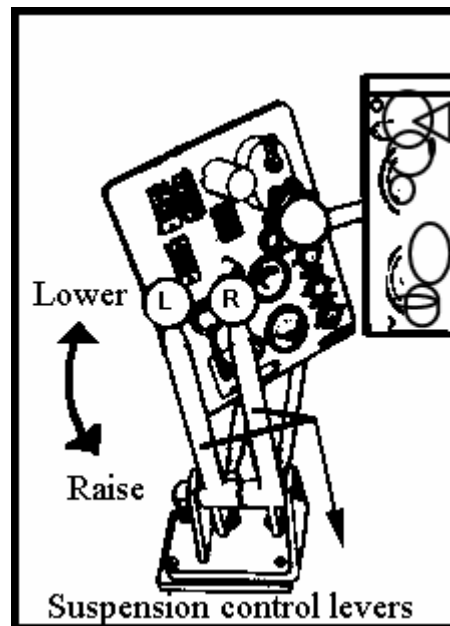
**Performance Steps**

Figure 052-227-1200-2  
Suspension Control Levers Pushed Forward

6. Place the clutch-brake (CB)/gear-steer (GS) control lever in the CB position (Figure 052-227-1200-3).

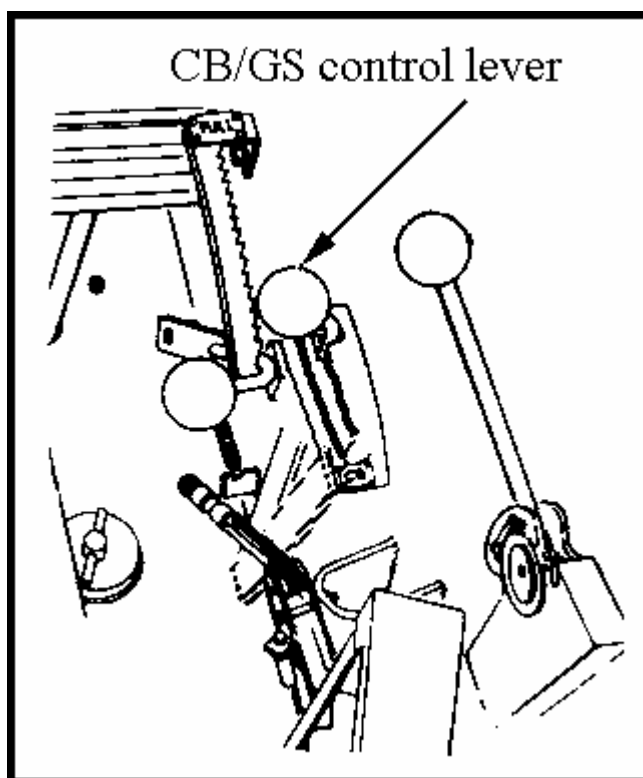
**Performance Steps**

Figure 052-227-1200-3  
CB/GS Control Lever

7. Perform straight-dozing operations.

NOTE: Dozing operations are most efficient when the ACE's engine speed is between 1,900 and 2,200 revolutions per minute (rpm).

- a. Shift the transmission to first (1) gear and press the accelerator pedal to move the vehicle forward (Figure 052-227-1200-4 and Figure 052-227-1200-5).

## Performance Steps

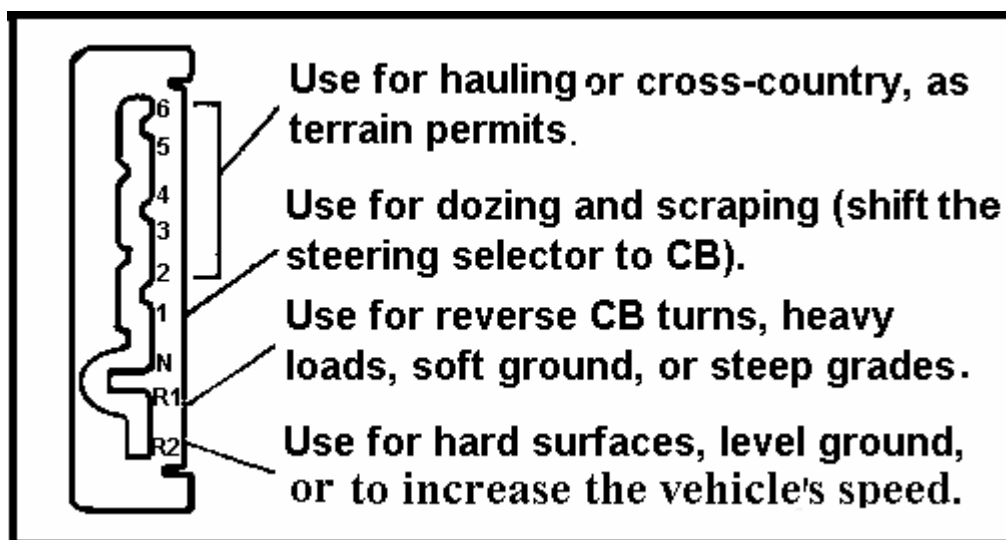


Figure 052-227-1200-4  
Gear Pattern

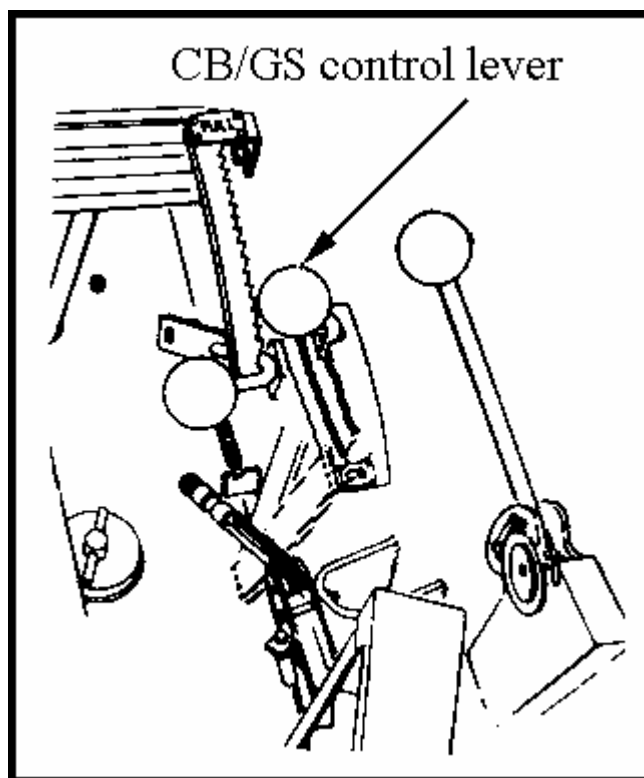


Figure 052-227-1200-5  
Brake and Accelerator Pedals

### Performance Steps

- b. Adjust the depth of the blade's cutting edge by gradually pushing the control levers forward to dig deeper or by pulling them back to dig shallow. If the blade's cutting edge is digging deeper on one side, the vehicle will steer in that direction. To correct the steering, gradually pull up on the control lever on the side to which the vehicle is veering, and gradually push down on the opposite control lever.

**CAUTION:** WHEN PERFORMING DOZING OPERATIONS, DO NOT USE THE STEERING WHEEL TO CORRECT OR CHANGE THE VEHICLE'S DIRECTION, AS IT WILL CAUSE THE TRACK TO BE THROWN OFF OF THE VEHICLE'S DRIVE SPROCKET.

8. Perform tilt-dozing operations.
  - a. Prepare the vehicle as for straight dozing operations.
    - (1) Adjust the suspension control lever to the UNSPRUNG position.
    - (2) Adjust the CB/GS control lever to the GS position.
  - b. Adjust the cutting edge. To tilt the right cutting edge down (left side high), pull the left-suspension control lever back, and push the right-suspension control lever forward. Apply the opposite motions to tilt the left cutting edge down (right side high) (Figure 052-227-1200-6).

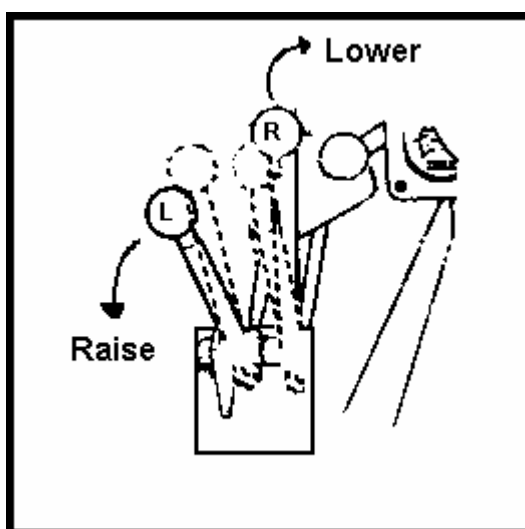


Figure 052-227-1200-6  
Adjusting the Cutting Edge

**NOTE:** The working or cutting side should be on the left, allowing the operator better visibility.

**NOTE:** The vehicle tilt can be adjusted while the vehicle is moving.

**CAUTION:** MAKE SHALLOW CUTS WHEN TILT DOZING WHILE IN THE GS POSITION. FAILURE TO DO SO COULD RESULT IN PREMATURE WEAR OF THE STEERING UNIT OR MAY CAUSE THE VEHICLE TO THROW THE TRACK OFF OF THE DRIVE SPROCKET.

**CAUTION:** KEEP THE VEHICLE STRAIGHT BY GENTLY MANIPULATING THE STEERING WHEEL. DO NOT MAKE HARD TURNS WITH THE STEERING WHEEL AS IT MAY CAUSE THE VEHICLE TO THROW THE TRACK OFF OF THE DRIVE SPROCKET.

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions.

**Brief soldier:** Tell the soldier that the vehicle must remain straight and that the dozing area must remain generally level and contain no deep dig ruts.

**Performance Measures**

	<b><u>GO</u></b>	<b><u>NO GO</u></b>
1. Started the ACE's engine and allowed it to warm-up for 3 to 5 minutes.	—	—
2. Ensured that the bowl was full of ballast.	—	—
3. Raised and lowered the apron several times to ensure that the apron made full contact with the hull.	—	—
4. Placed the suspension control lever in the UNSPRUNG position.	—	—
5. Moved the left- and the right-suspension control levers forward until the scraper blade rested on the ground.	—	—
6. Placed the CB/GS control lever in the CB position.	—	—
7. Performed straight-dozing operations. Kept the vehicle straight and maintained minimum washboard ground conditions.	—	—
8. Performed tilt-dozing operations. Kept the vehicle straight, made shallow cuts, and prevented the loss of a track.	—	—

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

**References****Required****Related**

TM 5-2350-262-10

**Drive an Armored Combat Earthmover (ACE), M9****052-227-1225**

**Conditions:** As an ACE operator in a field environment, given an ACE with a completed before-operation preventive-maintenance checks and services (PMCS), basic-issue items (BIs), and a driving area with varied terrain.

**Standards:** Apply the appropriate driving techniques to operate and maintain control of the ACE. Avoid injury to personnel and damage to the equipment.

**Performance Steps**

1. Adjust the operator's seat.
  - a. Adjust the height by pulling out (forward) on the vertical adjustment lever, using your body weight to control the movement of the seat (Figure 052-227-1225-1).
  - b. Adjust the forward and backward movement by pulling out (left) on the horizontal adjustment lever and moving the seat to a comfortable position (Figure 052-227-1225-1).



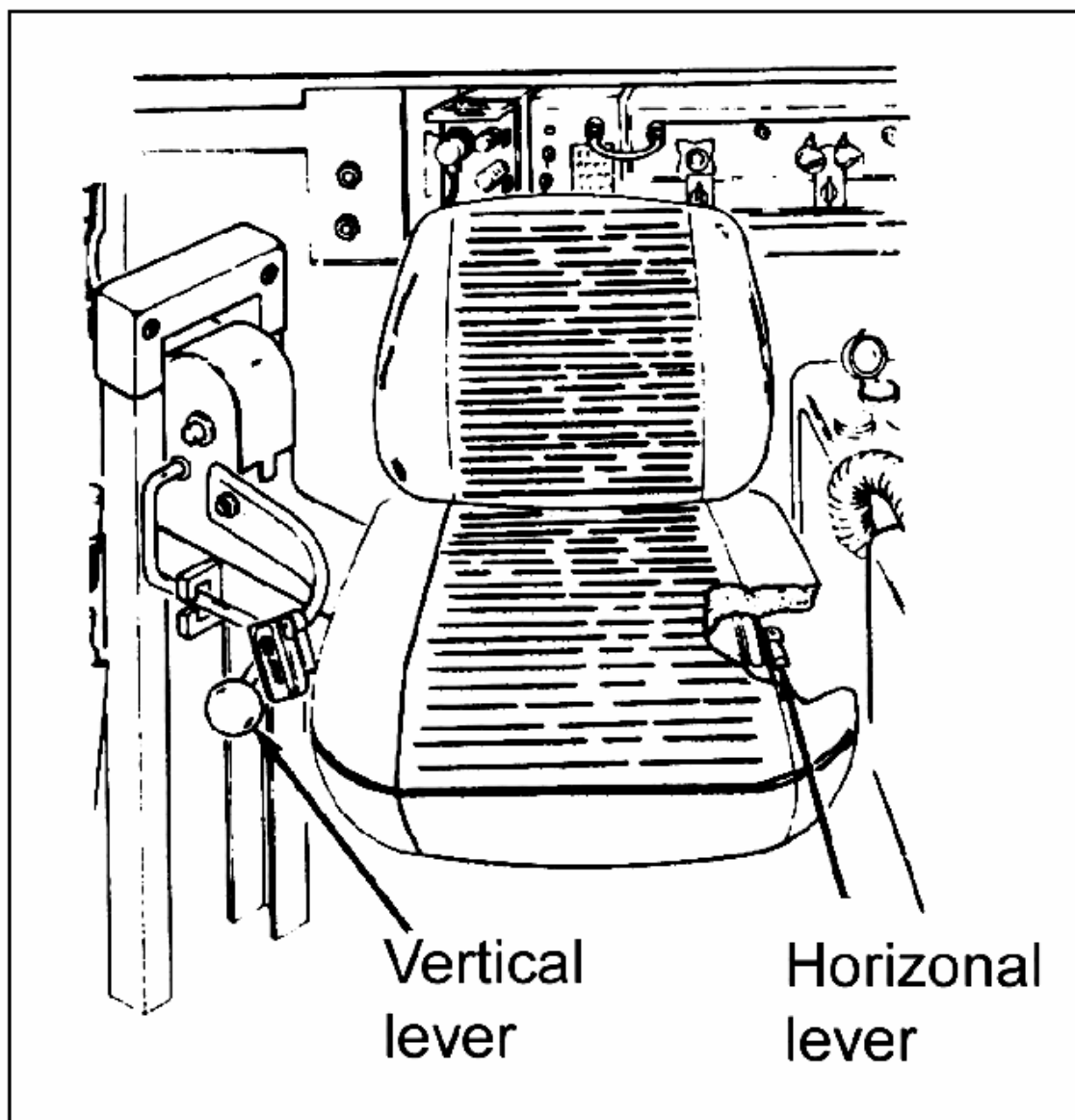
**Performance Steps**

Figure 052-227-1225-1  
Operator's Seat

- c. Fasten the seat belt.
- 2. Stow the cover from the operator's hatch, and hold down the hatch's latch until the latch engages (Figure 052-227-1225-2).

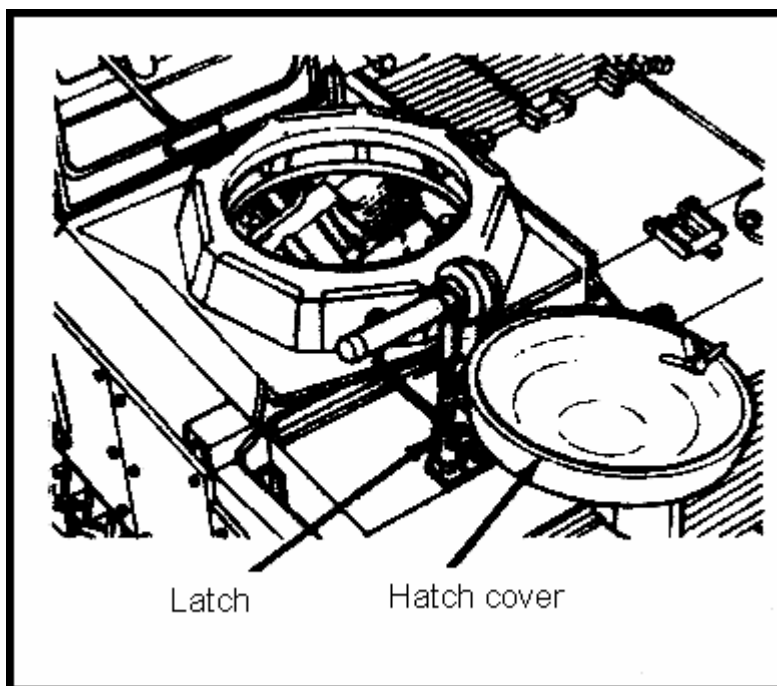
**Performance Steps**

Figure 052-227-1225-2  
Operator's Hatch Cover and Latch

NOTE: When the hold-down latch is over the center of the hatch-cover arm notch, but not in contact with the arm notch, the operator's hatch cover is in an open and locked position.

3. Ensure that the following switches are set to the OFF position (Figure 052-227-1225-3):

## Performance Steps

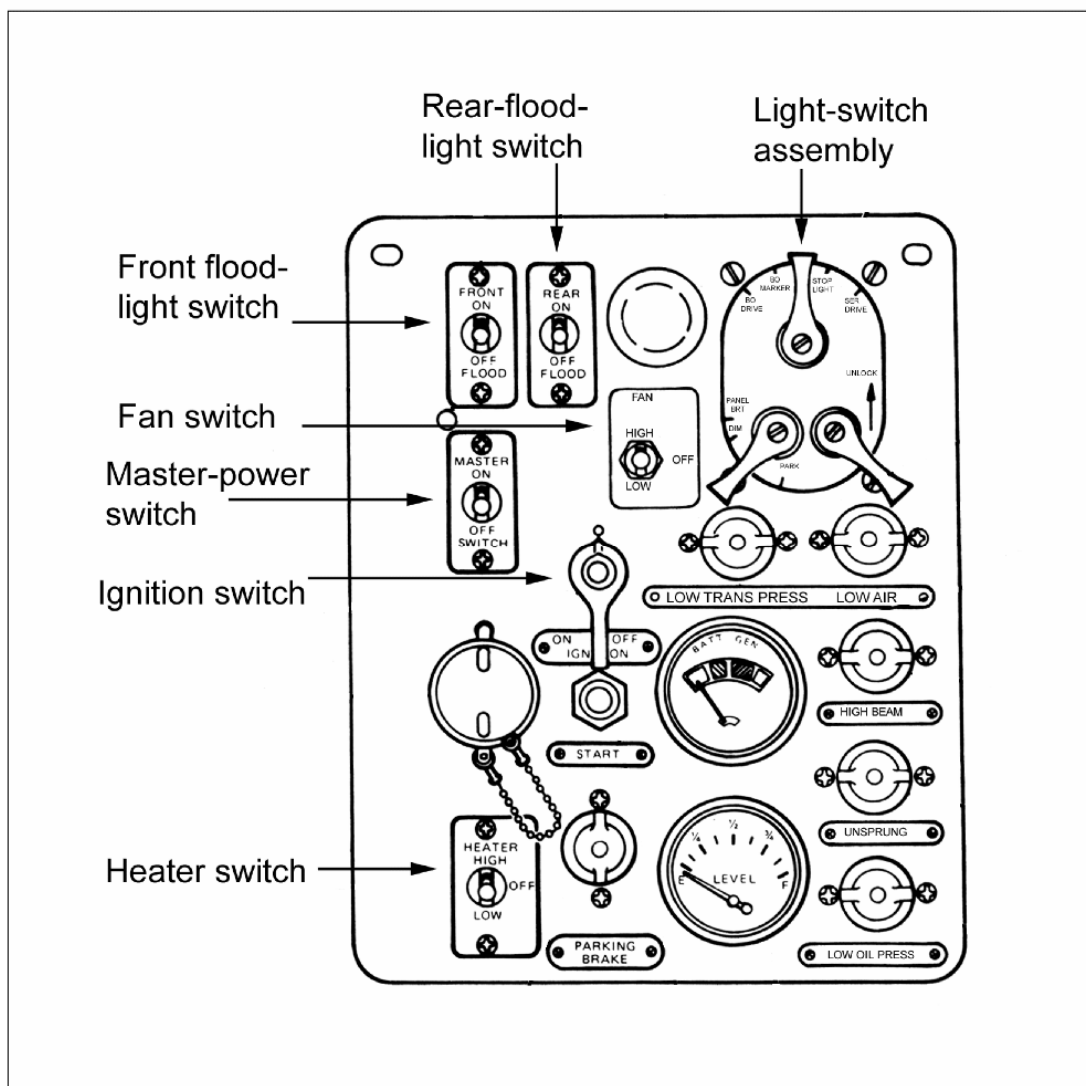


Figure 052-227-1225-3  
Switches in the OFF Position

- a. The front flood-light switch.
  - b. The rear flood-light switch.
  - c. The light-switch assembly.
  - d. The heater switch.
  - e. The ignition switch.
  - f. The master-power switch.
  - g. The fan switch.
4. Ensure that the hand throttle is pulled completely back (Figure 052-227-1225-4).
  5. Place the transmission shift lever in the neutral (N) position (Figure 052-227-1225-4).

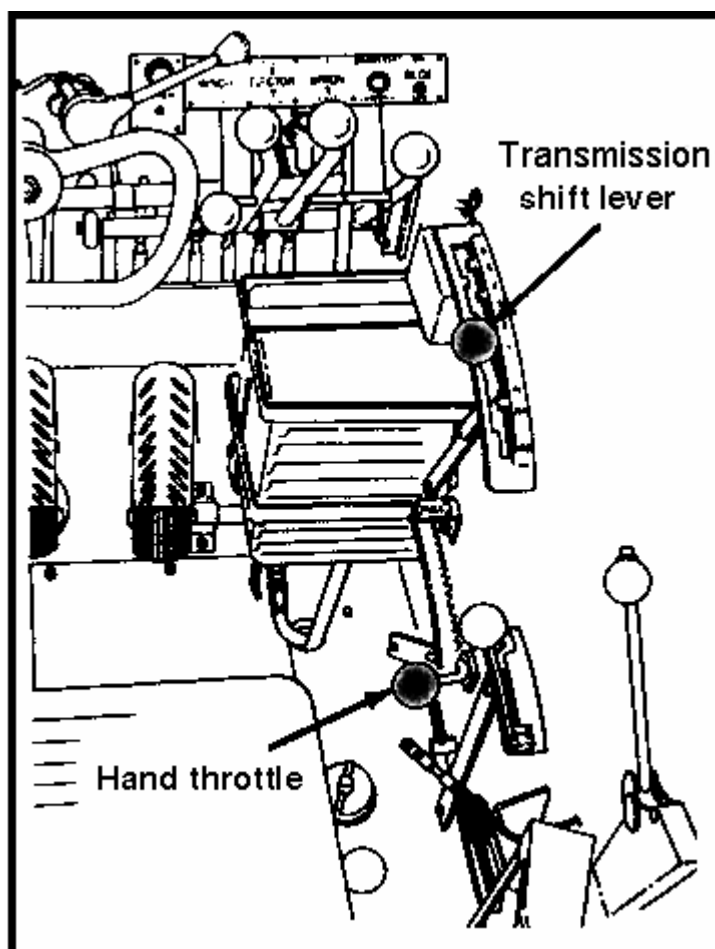
**Performance Steps**

Figure 052-227-1225-4  
Hand Throttle and Transmission Shift Lever

6. Ensure that the following auxiliary equipment is set to the OFF position:
  - a. The radio.
  - b. The smoke-grenade launcher.
  - c. The nuclear, biological, chemical (NBC) system.
7. Set the master-power switch and the ignition switch to the ON position.
8. Ensure that the warning alarms sound and that the following warning lights illuminate (Figure 052-227-1225-5):

## Performance Steps

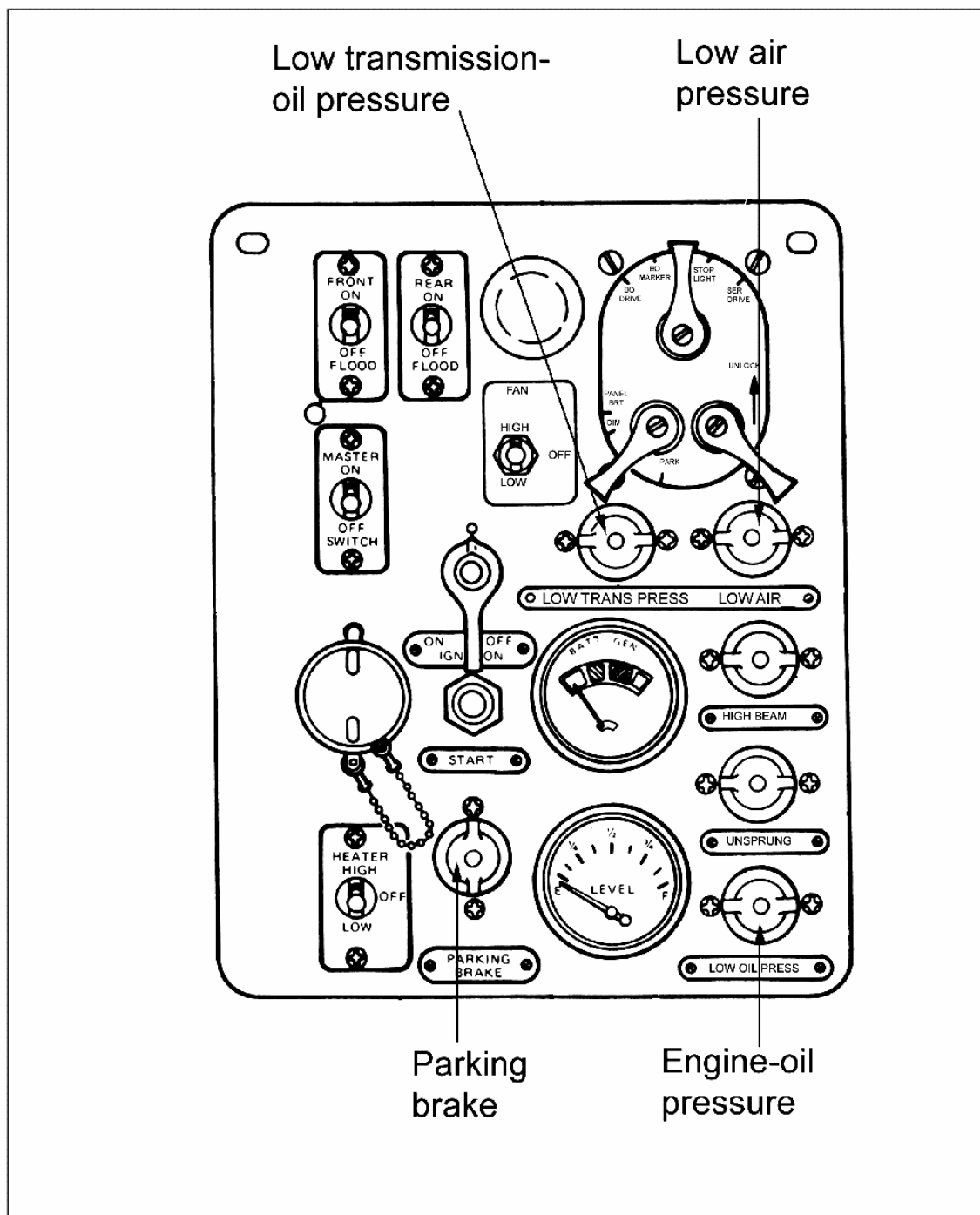


Figure 052-227-1225-5  
Vehicle Warning Indicators

- The low transmission-oil pressure.
- The low air pressure.
- The low engine-oil pressure.
- The parking brake.

**Performance Steps**

9. Press the start switch and hold it until the engine starts.
10. Move the hand throttle forward until the engine speed is about 800 revolutions per minute (rpm). Allow the engine to warm-up for 3 to 5 minutes.
11. Check the status of the gauges (Figure 052-227-1225-6). The tachometer should read 800 rpm, and the following gauges should be in the green area:

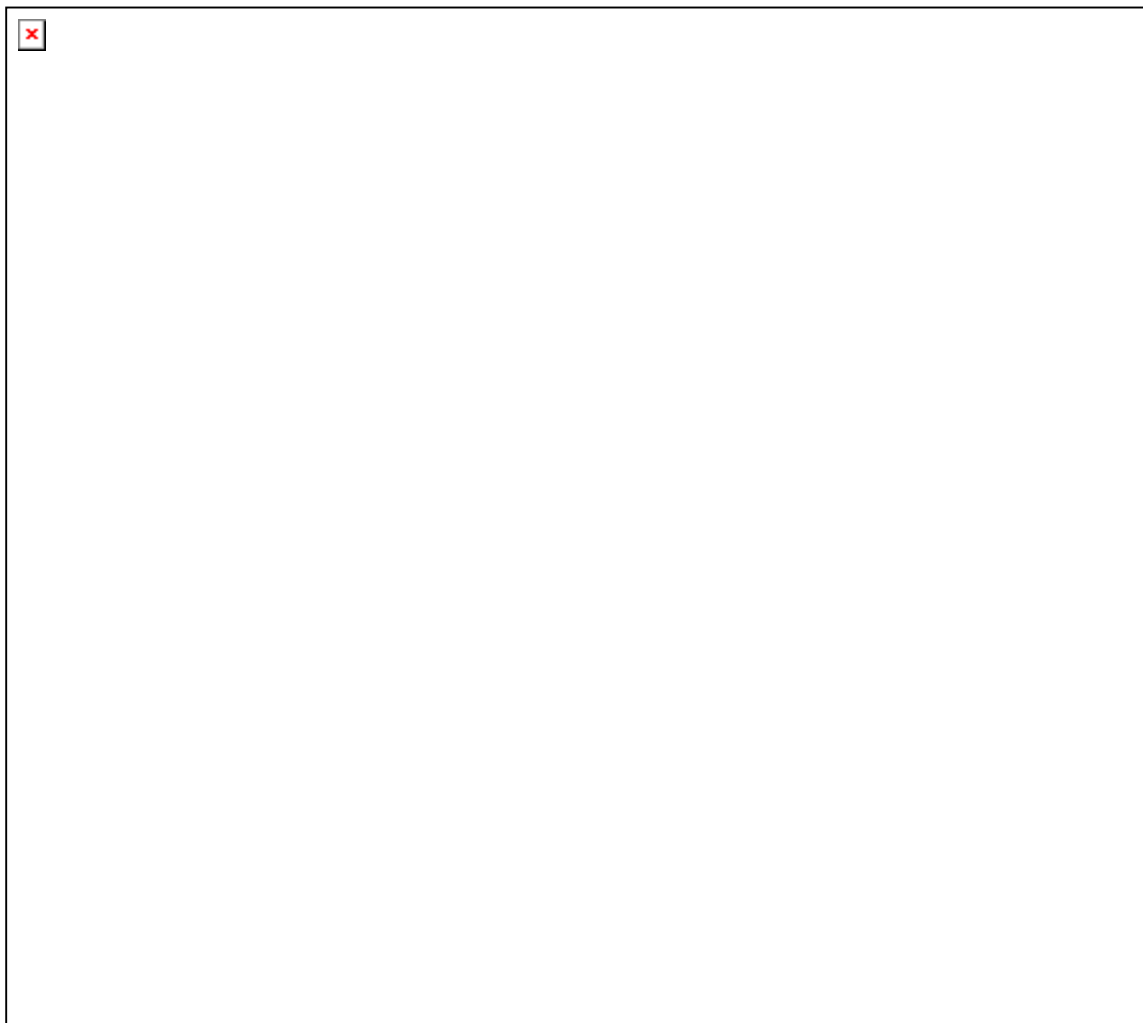


Figure 052-227-1225-6  
Vehicle Gauges

- a. The engine-oil pressure.
  - b. The water temperature.
  - c. The hydraulic-oil temperature.
  - d. The transmission-oil temperature.
12. Ensure that the following alarms are in the OFF position:
- NOTE: The alarm for the parking brake sounds until the parking brake is released.
- a. The low transmission-oil pressure.
  - b. The low air pressure.
  - c. The low oil pressure.

**Performance Steps**

13. Place the suspension control lever in the SPRUNG position (Figure 052-227-1225-7).

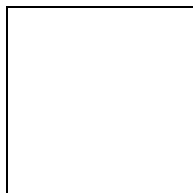


Figure 052-227-1225-7  
Suspension Control Levers

14. Place the clutch-break (CB)/gear-steer (GS) control lever in the GS position for normal driving conditions and in the CB position for driving at a low speed in close quarters or when performing pivot turns (Figure 052-227-1225-8).

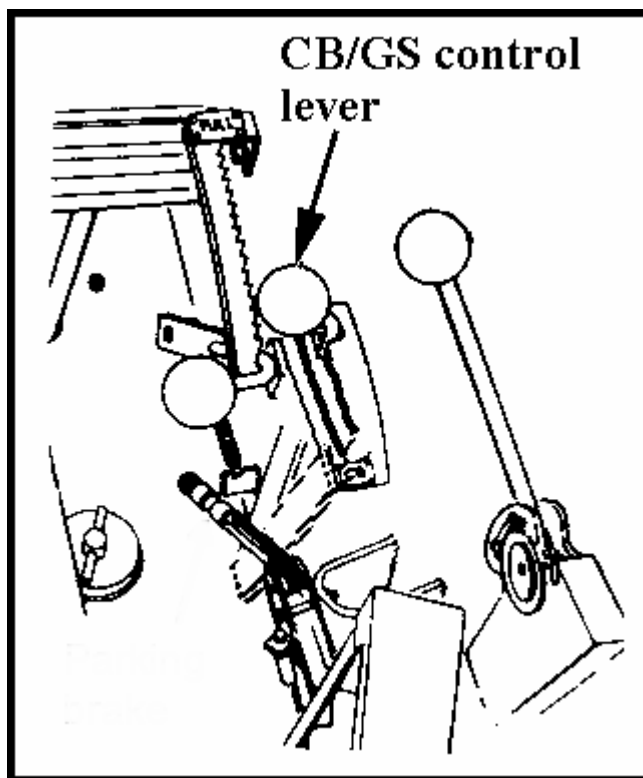


Figure 052-227-1225-8  
CB/GS Control Lever

NOTE: When shifting the ACE into fifth (5) or sixth (6) gear, the CB/GS steer selector automatically shifts into GS. When shifting from fifth or sixth gear, manually select the CB position. When shifting into reverse first (R1) or reverse second (R2), the CB/GS control lever selector automatically shifts into the CB position. When shifting from R1 or R2, manually select the GS position.

15. Press the brake pedal, and release the parking brake (Figure 052-227-1225-9 and Figure 052-227-1225-10).

## Performance Steps

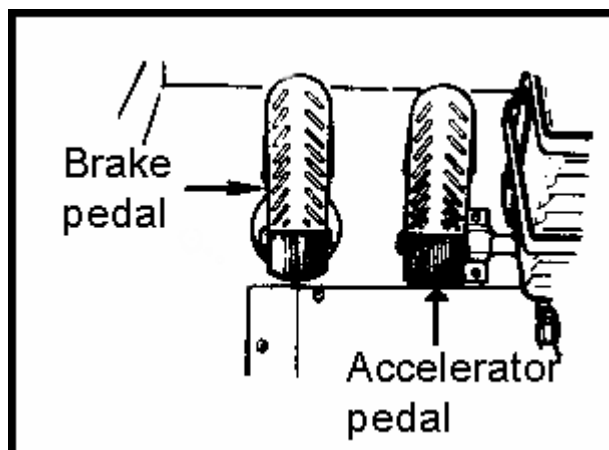


Figure 052-227-1225-9  
Brake and Accelerator Pedals

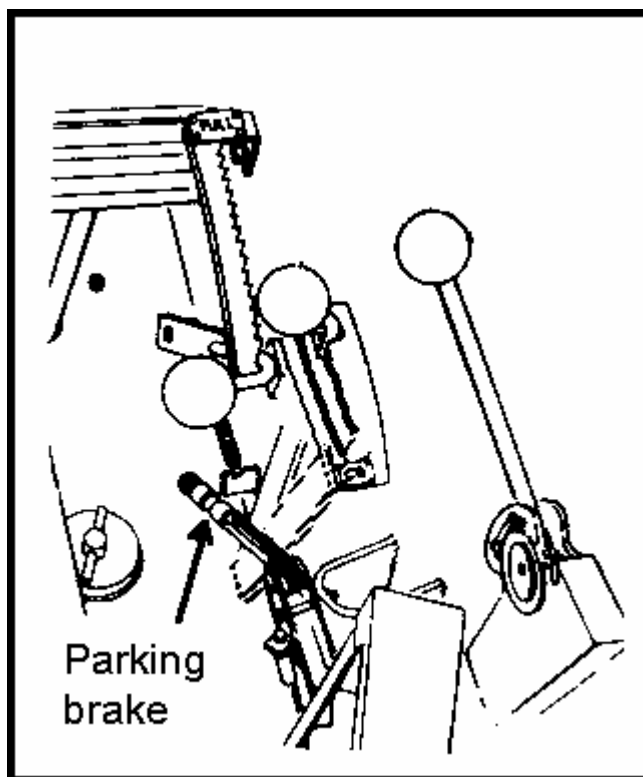


Figure 052-227-1225-10  
Parking Brake

16. Move the transmission shift lever to first (1) or second (2) gear to drive forward or to R1 or R2 to drive in reverse (Figure 052-227-1225-11).



## Performance Steps

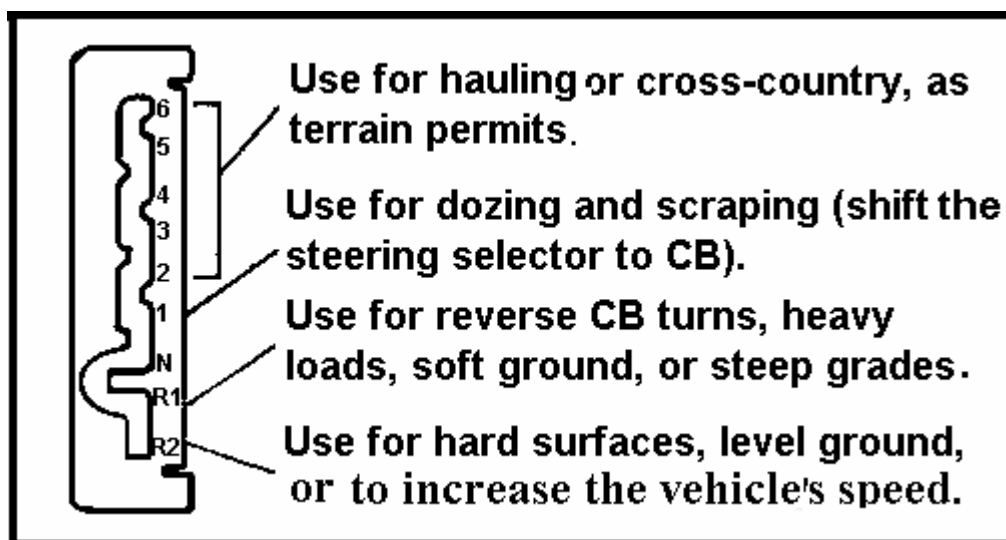


Figure 052-227-1225-11

Gear Pattern

**CAUTION:** THE BLADE SHOULD BE FOLDED WHEN DRIVING FOR EXTENDED PERIODS OF TIME OVER UNEVEN TERRAIN, FOR ENTERING OR LEAVING WATER ON A STEEP BANK, OR WHEN ADDITIONAL GROUND CLEARANCE IS REQUIRED.

**CAUTION:** NEVER DRIVE THE ACE DOWN AN INCLINE WITH THE TRANSMISSION IN THE N POSITION.

**NOTE:** During normal cross-country operations, the ACE's bowl should be empty; however, in some terrain or soil conditions, the vehicle's performance may be improved by adding ballast to the bowl or by moving the ejector forward. The operator must determine the need for filling the bowl during cross-country operations.

**NOTE:** Shifting the transmission with the engine under full power can damage the transmission. Bring the vehicle to a full stop before shifting from forward to reverse or from reverse to forward.

**NOTE:** Momentarily release the accelerator before shifting the transmission.

17. Release the brake pedal. Gradually press the accelerator to put the vehicle in motion and increase the speed.
18. Use the steering wheel to turn the vehicle left or right.
19. Monitor the vehicle's gauges. Do not exceed the posted speed limit or the recommended safe speed for the driving conditions.
20. Stop the vehicle. Move your foot from the accelerator pedal to the brake pedal, and gradually apply pressure until the vehicle stops.
21. Shift the transmission shift lever to the N position.
22. Press the brake pedal, and pull the parking brake lever up, back, and over the center. Release the brake pedal.
23. Set the ignition switch and the master-power switch to the OFF position.

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions. Ensure that there are various types of terrain and obstacles to maneuver around and over. If the terrain conditions are not available, create a situation for each terrain condition and have the soldier explain the appropriate driving methods. Obstacles and ditches can be constructed. Any type of elevation can be used for a side slope.

Brief soldier: Tell the soldier the route to be driven and any additional safety requirements directed by the unit's standing operating procedure (SOP)

<b>Performance Measures</b>	<b><u>GO</u></b>	<b><u>NO GO</u></b>
1. Adjusted the operator's seat.	—	—
2. Stowed the cover from the operator's hatch and held down the hatch's latch until the latch engaged.	—	—
3. Ensured that the proper switches were set to the OFF position.	—	—
4. Ensured that the hand throttle was pulled completely back.	—	—
5. Placed the transmission shift lever in the N position.	—	—
6. Ensured that the auxiliary equipment was set to the OFF position.	—	—
7. Set the master-power switch and the ignition switch to the ON position.	—	—
8. Ensured that the warning alarms sounded and that the warning lights illuminated.	—	—
9. Started the vehicle's engine.	—	—
10. Moved the hand throttle forward until the engine speed reached 800 rpm. Allowed the engine to warm-up for 3 to 5 minutes.	—	—
11. Checked the status of the gauges.	—	—
12. Ensured that the proper alarms were to the OFF position.	—	—
13. Placed the suspension control lever in the SPRUNG position.	—	—
14. Placed the CB/GS control lever in the required position.	—	—
15. Released the parking brake, moved the transmission to 1 or 2, released the brake pedal, and put the vehicle in motion. Adjusted the steering to the left or the right.	—	—
16. Monitored the vehicle's gauges. Did not exceed the posted or the recommended speed limits.	—	—
17. Brought the vehicle to a stop, placed the transmission shift lever in the N position, engaged the parking brake, and set the ignition switch and the master-power switch to the OFF position.	—	—

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

## References

### Required

**Related**  
TM 5-2350-262-10

**Perform Fording Operations with an Armored Combat Earthmover (ACE), M9**  
**052-227-1233**

**Conditions:** As an ACE operator in a field environment, given an ACE with a completed before-operation preventive- maintenance checks and services (PMCS), basic-issue items (BIIs), and an area with a water obstacle no more than 3 feet deep.

**Standards:** Perform fording operations with an ACE. Avoid injury to personnel and equipment damage.

**Performance Steps**

1. Start the ACE's engine, and allow it to warm-up for 3 to 5 minutes.
2. Place the clutch-break (CB)/gear-steer (GS) control lever in the CB or the GS position (Figure 052-227-1233-1).

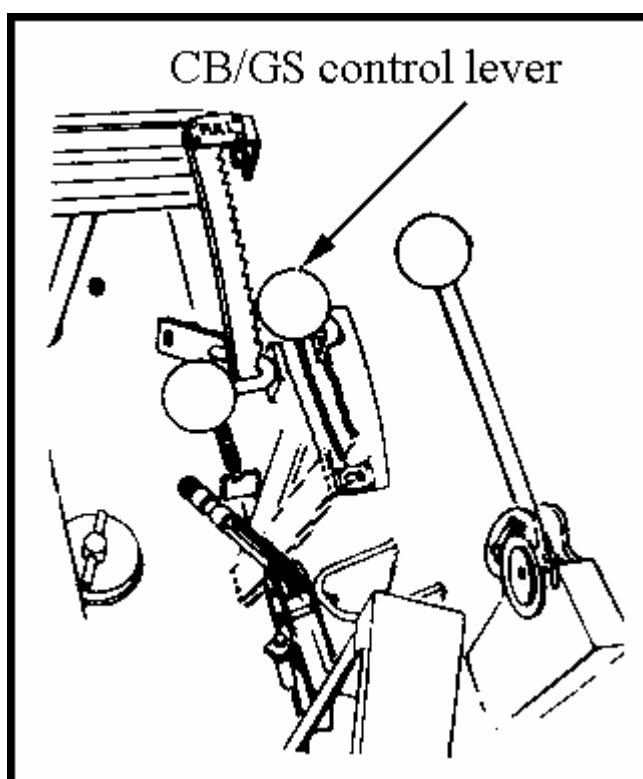


Figure 052-227-1233-1  
CB/GS Control Lever

NOTE: When dozing is performed during fording operations, refer to Task 052-227-1200.

3. Place the suspension control lever in the SPRUNG position (Figure 052-227-1233-2).

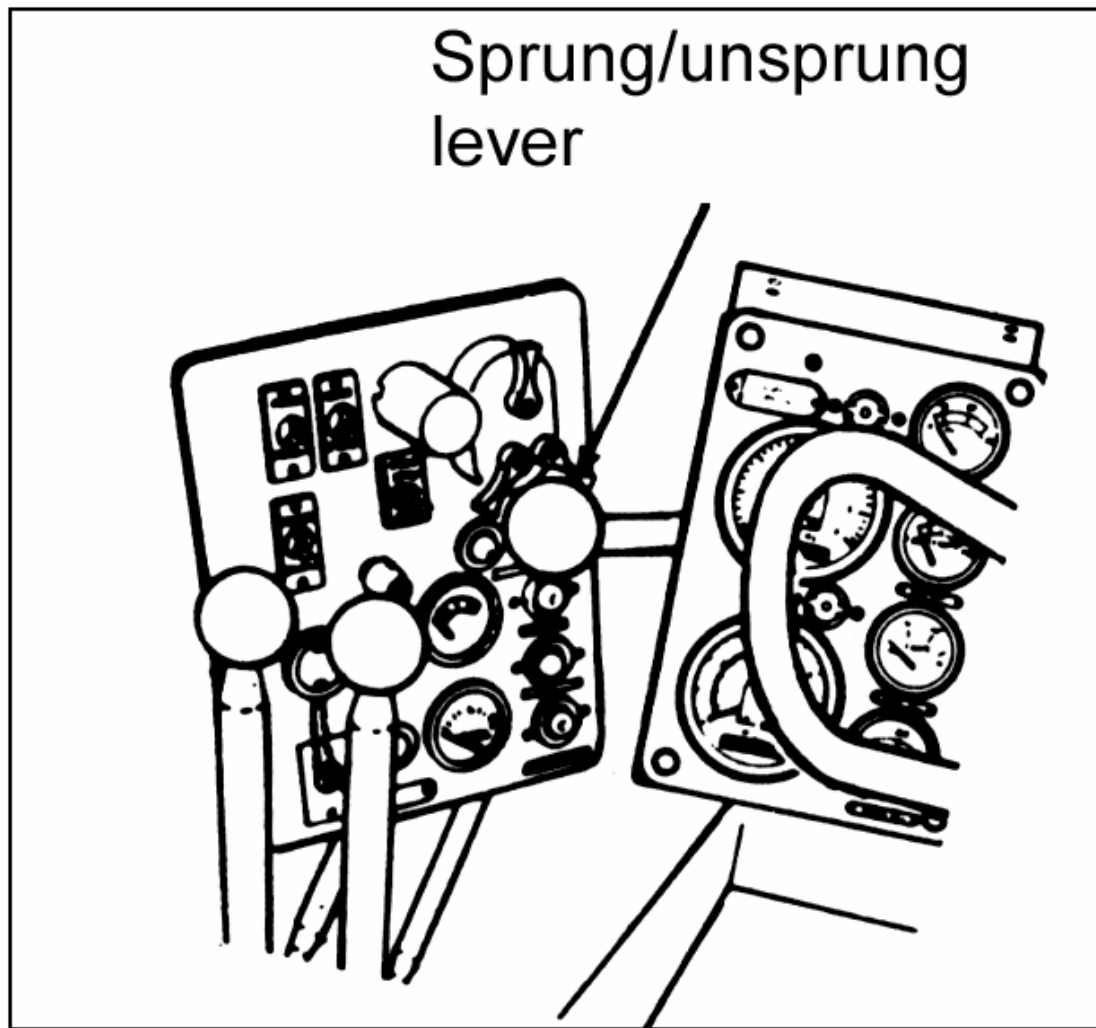
**Performance Steps**

Figure 052-227-1233-2  
Suspension Control Levers

4. Place the transmission shift lever in first (1) gear. Shift through the gear pattern as necessary (Figure 052-227-1233-3).

## Performance Steps

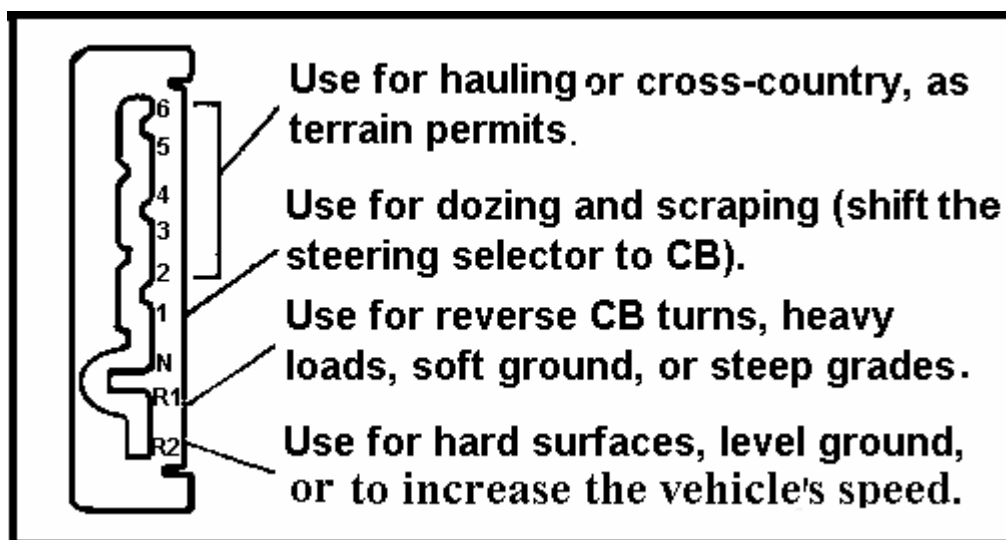


Figure 052-227-1233-3

Gear Pattern

NOTE: It is normal for water to leak into the bowl during fording operations.

5. Enter the water at a right angle to the bank, and drive through the water in a low gear.
6. Adjust the vehicle's speed to accommodate steep shores. Shift the transmission to first (1) gear, and gradually accelerate the engine.
7. Push the bilge-pump control lever to the ON position. The bilge-pump light should come on (Figure 052-227-1233-4).

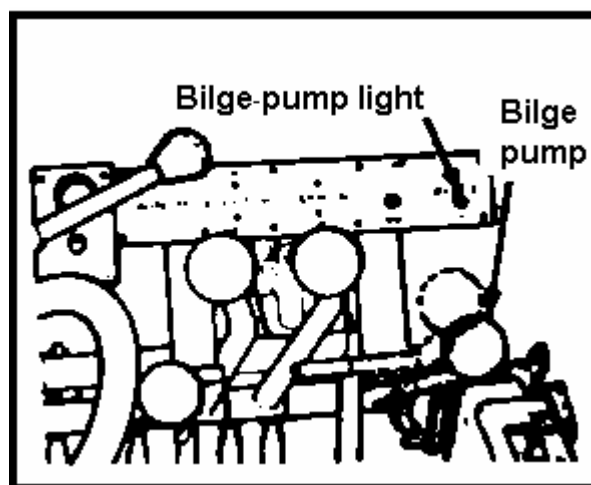


Figure 052-227-1233-4

Bilge-Pump Control Handle

NOTE: A minimum engine speed of 1,000 revolutions per minute (rpm) is required for the bilge pump to operate.

8. Pump the water out of the hull, and return the bilge-pump control lever to the OFF position.

### Performance Steps

9. Remove the water from the rear hull by lifting the platform's floor plates and pushing the drain valve open (Figure 052-227-1233-5).

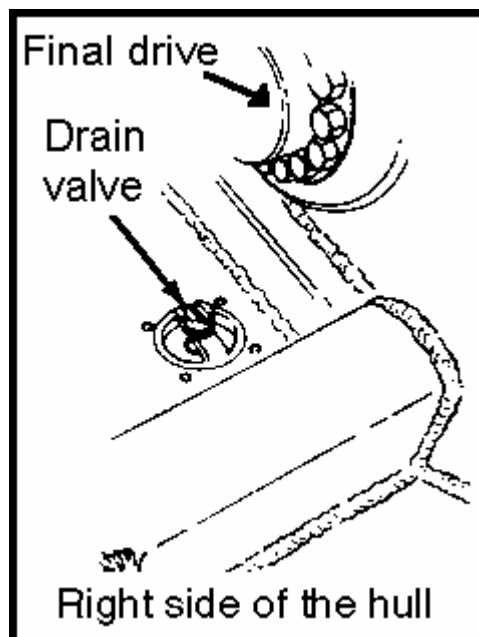


Figure 052-227-1233-5  
Drain Valve

10. Notify unit maintenance to check for water in both final drives (if the water level was above the drive sprockets during fording operations).

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions.

**Brief soldier:** Tell the soldier that he will be required to complete the performance measures according to the standards set forth in this task.

Performance Measures	<u>GO</u>	<u>NO GO</u>
1. Started the ACE's engine and allowed it to warm-up for 3 to 5 minutes.	—	—
2. Placed the CB/GS control lever in the CB or the GS position.	—	—
3. Placed the suspension control lever in the SPRUNG position.	—	—
4. Placed the transmission shift lever in first (1) gear. Shifted through the gear pattern as necessary.	—	—
5. Entered the water at a right angle to the bank and drove through the water in a low gear.	—	—
6. Adjusted the vehicle's speed to accommodate steep shores.	—	—
7. Switched the bilge-pump control lever to the ON position.	—	—
8. Pumped the water from the hull and returned the bilge-pump control lever to the OFF position.	—	—

**Performance Measures**

- |   | <u><b>GO</b></u> | <u><b>NO GO</b></u> |
|---|------------------|---------------------|
| 9. Removed the water from the rear hull by lifting the platform's floor plates and pushing the drain valve open.                                    | _____            | _____               |
| 10. Notified unit maintenance to check for water in both final drives (if the water level was above the drive sprockets during fording operations). | _____            | _____               |

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

**References****Required****Related**

TM 5-2350-262-10

## Construct Vehicle Fighting Positions with an Armored Combat Earthmover (ACE), M9

### 052-227-1226

**Conditions:** As an ACE operator in a field environment, given an ACE with a completed before-operation preventive-maintenance checks and services (PMCS), basic-issue items (BIs), Field Manual (FM) 5-34 or FM 5-103, an approved digging area, and a vehicle to proof and occupy the fighting position.

**Standards:** Construct a hasty or deliberate fighting position, with the proper dimensions, in the suggested digging time and according to FM 5-34 or FM 5-103. Feather and level all excess spoil in order to prevent detection from enemy scouts. Ensure that the bottom of the fighting position is level.

#### Performance Steps

1. Start the ACE's engine, and allow it to warm-up for 3 to 5 minutes.
2. Identify the type of vehicle requiring the fighting position.
3. Use FM 5-34 or FM 5-103 to determine the dimensions and the time required take to construct the vehicle fighting position.
4. Ensure that the ACE's bowl is full of ballast. (Refer to Task 052-227-1240 for additional information.)
5. Construct the vehicle fighting position. (Refer to Task 052-227-1200 for additional information.)

**WARNING:** DO NOT ATTEMPT TO DIG IN VISUALLY ROCKY TERRAIN. IF BURIED BOULDERS, ICE, OR ANY ENVIRONMENTAL OBSTRUCTION MAKES CONSTRUCTION IMPOSSIBLE, INFORM THE EVALUATOR.

**NOTE:** Always dig from the enemy side, and push the spoil toward the friendly side. This will help to hide the spoil and minimize the ACE's tracks along the front of the fighting position. Enemy scouts can spot tracks, especially during daylight hours.

**NOTE:** Use natural defilades, such as road cuts and ditches, when available.

6. Instruct the proof vehicle to periodically pull into the fighting position to check the construction progress.
7. Ensure that the position is level and the spoil is feathered.

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions.

**Brief soldier:** Tell the soldier that he will be required to complete the performance measures according to the standards set forth in this task.

Performance Measures	<u>GO</u>	<u>NO GO</u>
1. Started the ACE's engine and allowed it to warm-up for 3 to 5 minutes.	—	—
2. Identified the type of vehicle to be used in the fighting position.	—	—
3. Used FM 5-34 or FM 5-103 to determine the dimensions and the time required to construct the vehicle fighting position.	—	—
4. Ensured that the ACE's bowl was full of ballast.	—	—
5. Constructed the vehicle fighting position.	—	—
6. Checked the construction progress by periodically having the proof vehicle pull into the fighting position.	—	—



**Performance Measures****GO**    **NO GO**

7. Ensured that the position was level and the spoil was feathered.

\_\_\_\_\_

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

**References****Required**

FM 5-103

FM 5-34

**Related**

TM 5-2350-262-10

**Perform Scraper Operations with an Armored Combat Earthmover (ACE), M9**  
**052-227-1240**

**Conditions:** As an ACE operator in a field environment, given an ACE with an empty bowl and an unfolded blade, a completed before-operation preventive-maintenance checks and services (PMCS), basic-issue items (BIIs), and an approved digging area.

**Standards:** Load the bowl of the ACE, spread about one half of the material over a designated area, and dump the remaining material out of the bowl. Avoid injury to personnel and equipment damage.

**Performance Steps**

1. Start the ACE's engine, and allow the engine to warm-up for 3 to 5 minutes.
2. Place the clutch-break (CB)/gear-steer (GS) control lever in the CB position (Figure 052-227-1240-1).

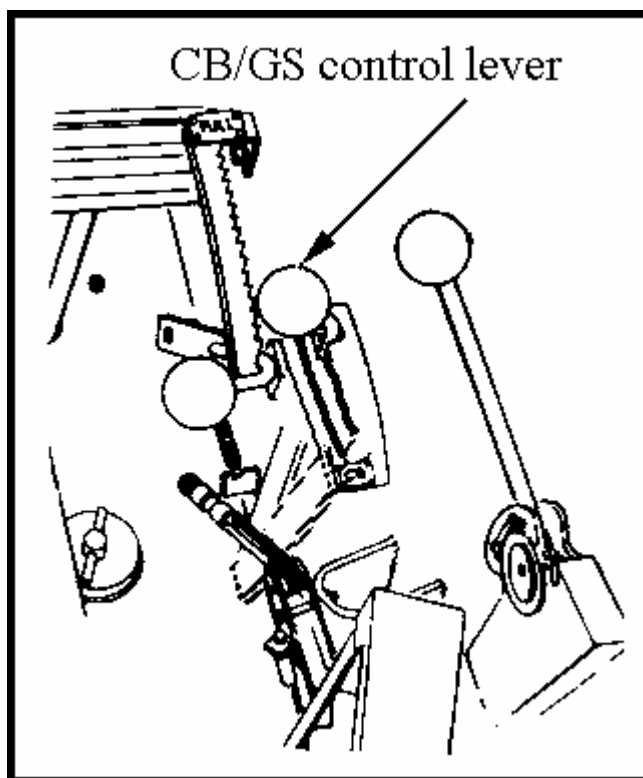


Figure 052-227-1240-1  
CB/GS Control Lever

3. Place the suspension control lever in the UNSPRUNG position (Figure 052-227-1240-2).

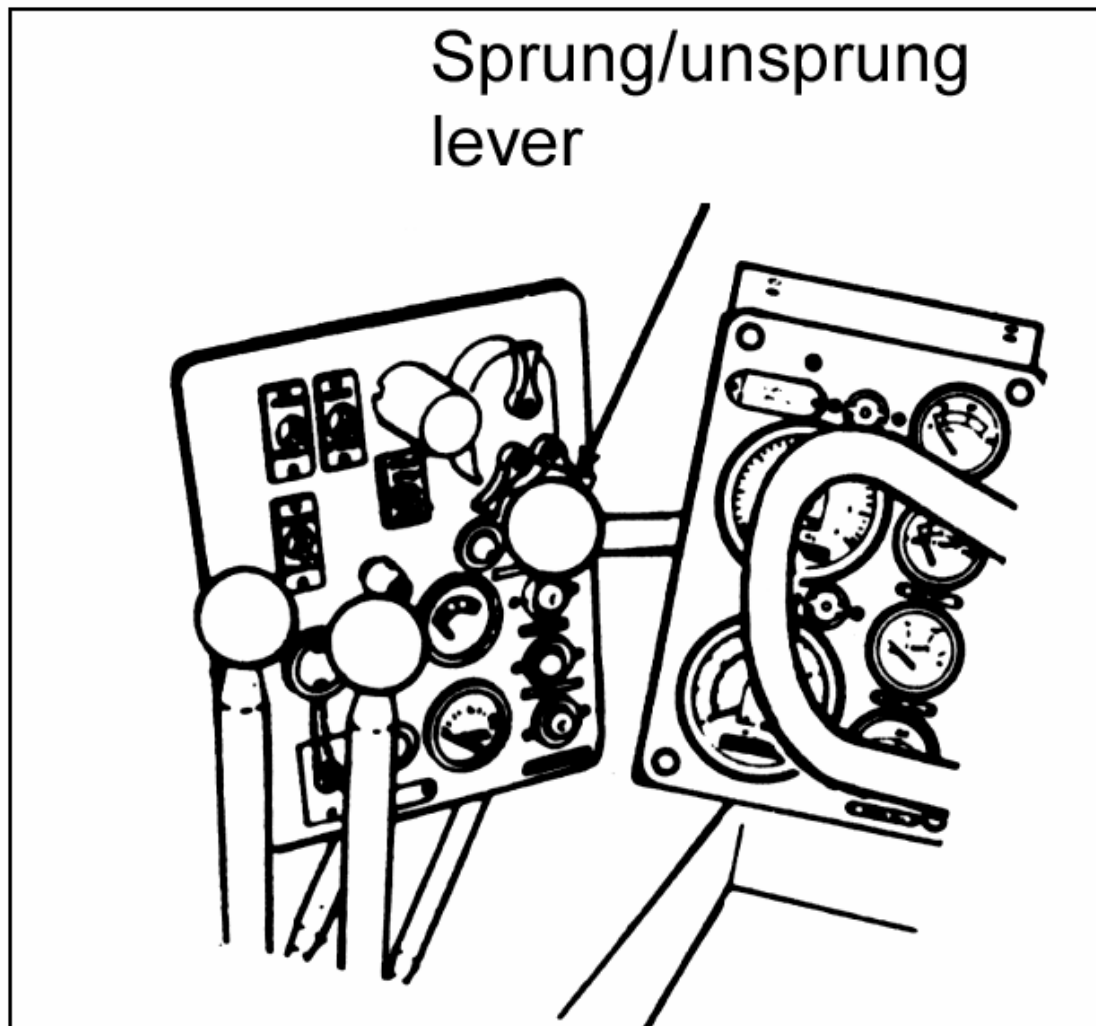
**Performance Steps**

Figure 052-227-1240-2  
Suspension Control Levers

4. Load the bowl.
  - a. Move the apron control lever to the UP position, and raise the apron 12 to 18 inches (Figure 052-227-1240-3).

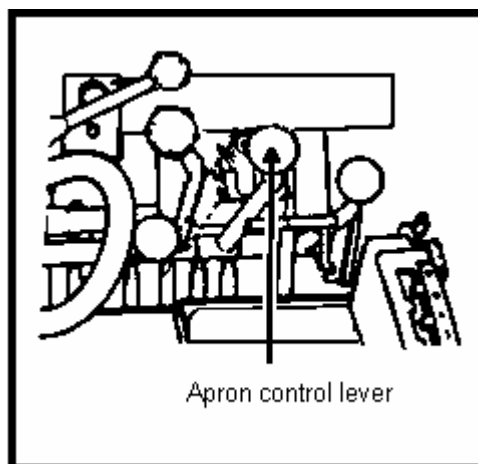
**Performance Steps**

Figure 052-227-1240-3  
Apron Control Lever

NOTE: The height of the apron may vary depending on the type of material loaded in the bowl.  
b. Pull the ejector control lever back to fully retract the ejector (Figure 052-227-1240-4).

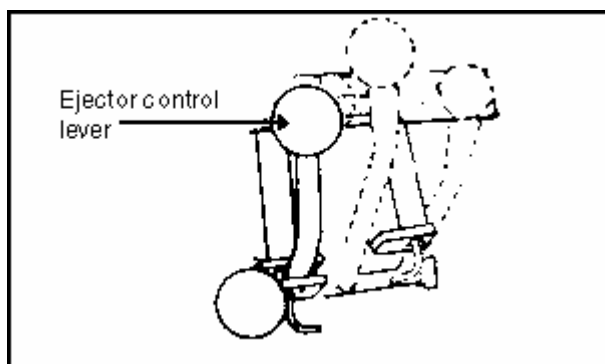


Figure 052-227-1240-4  
Ejector Control Lever

c. Place the transmission shift lever in first (1) gear, and gradually accelerate the engine (Figure 052-227-1240-5). Move the vehicle forward.

## Performance Steps

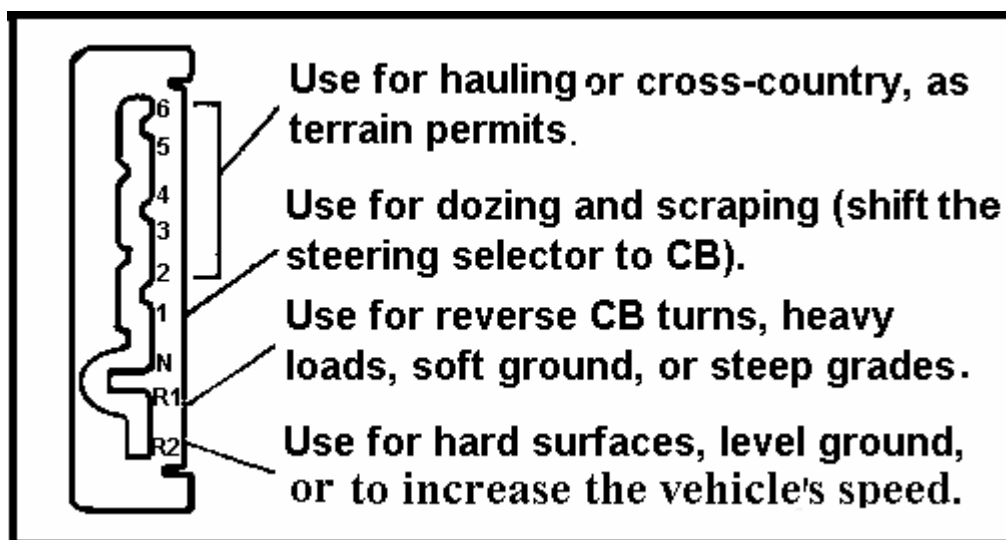


Figure 052-227-1240-5  
Gear Pattern

- d. Push the left- and the right-suspension control levers forward to lower the scraper blade (Figure 052-227-1240-6).

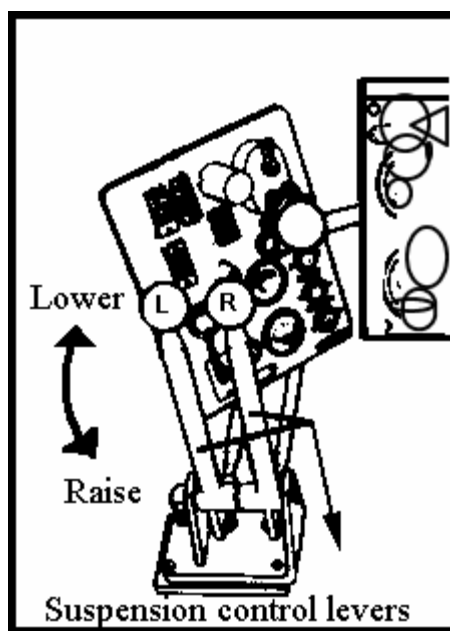


Figure 052-227-1240-6  
Suspension Control Levers Pushed Forward

- e. Use the scraper blade (Figure 052-227-1240-7) to make a 3- to 4-inch cut. The size of the cut may vary according to the surface conditions and the material to be loaded. Fill the bowl.

## Performance Steps

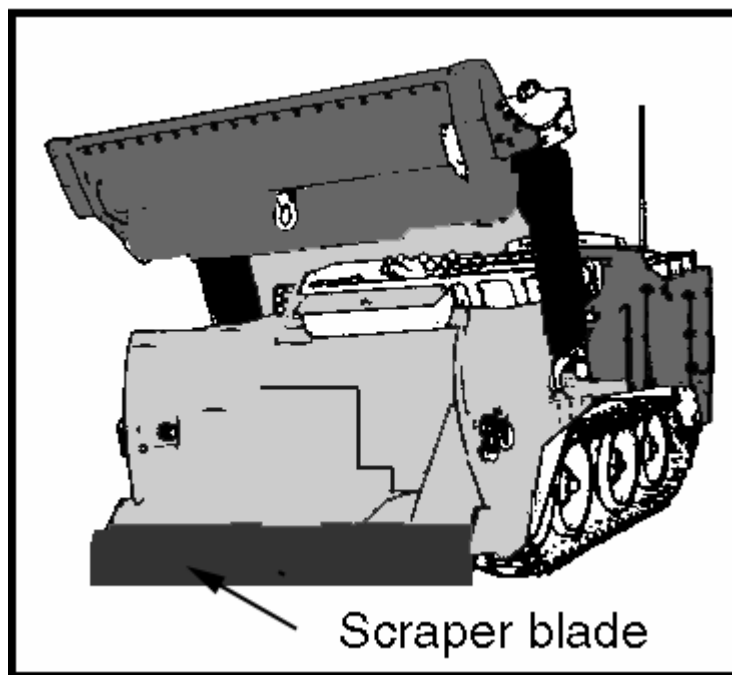


Figure 052-227-1240-7  
Scraper Blade

- f. Pull the left- and right-suspension control levers back, and raise the front of the vehicle. Place the suspension control lever in the SPRUNG position.
  - g. Lower the apron, and drive the vehicle to the work site.
5. Dump, spread, and scrape the material.
    - a. Push the apron control lever forward, and raise the apron to the full open position.
    - b. Place the suspension control lever in the SPRUNG position.
- NOTE: Spreading can be performed while the vehicle is moving in forward or reverse.
- c. Spread the material.
    - (1) Drive the vehicle slowly forward (or in reverse) and gradually move the ejector forward.
    - (2) Control the depth of the spread material by adjusting the vehicle's speed and the movement of the ejector.
  - d. Pile or dump the material.
    - (1) Keep the suspension control lever in the SPRUNG position when the vehicle is stationary. Use the ejector to push the material out of the bowl.
    - (2) Operate the vehicle in reverse as necessary.
6. Lower the apron, and retract the ejector.

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions.

Brief soldier: Tell the soldier that he will be required to complete the performance measures according to the standards set forth in this task.

## Performance Measures

1. Started the vehicle and allowed the engine to warm-up for 3 to 5 minutes.
2. Placed the CB/GS control lever in the CB position.

GO      NO GO

—      —  
—      —

**Performance Measures**

3. Placed the suspension control lever in the UNSPRUNG position.
4. Loaded the bowl.
5. Dumped, spread, and scraped the material.
6. Lowered the apron and retracted the ejector.

**GO**    **NO GO**

_____	_____
_____	_____
_____	_____
_____	_____

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

**References****Required****Related**

LO 5-2350-262-12

TM 5-2350-262-10

## Handle Palletized Cargo with an Armored Combat Earthmover (ACE), M9

### 052-227-1241

**Conditions:** As an ACE operator in a field environment, given an ACE with an empty bowl, a completed before-operation preventive-maintenance checks and services (PMCS), basic-issue items (BIs), an assistant, and a suitable loading area with palletized cargo and tie-down straps.

**Standards:** Load the palletized cargo in the bowl of the ACE by using the ejector. The apron should be able to fully close. Secure the cargo in the bowl by using the tie-down strap. Unload the cargo from the bowl by using the ejector. Avoid injury to personnel and equipment damage.

### Performance Steps

1. Start the ACE's engine and allow it to warm-up for 3 to 5 minutes.
2. Remove the chain from the apron stowage.
3. Load the palletized cargo.
  - a. Push the apron control lever forward and raise the apron to the full open position (Figure 052-227-1240-1). Instruct the assistant to install the two apron lock pins in the apron.

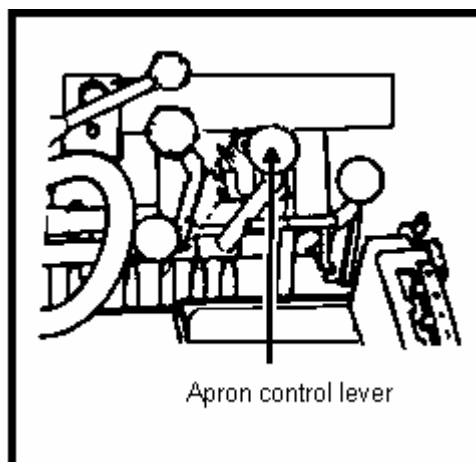


Figure 052-227-1241-1  
Apron Control Lever

- b. Position the vehicle near the palletized cargo.
- WARNING: DO NOT OPERATE THE EJECTOR WHEN PERSONNEL ARE IN THE BOWL, UNLESS THE EJECTOR LOCK IS ENGAGED. DO NOT WORK UNDER THE VEHICLE UNLESS THE HULL IS BLOCKED AND THE APRON LOCK PINS ARE INSTALLED. SEVERE INJURY OR DEATH TO PERSONNEL MAY RESULT.**
- c. Adjust the vehicle's controls.
      - (1) The clutch-break (CB)/gear-steer (GS) control lever should be in (GS) position (Figure 052-227-1241-2).



**Performance Steps**

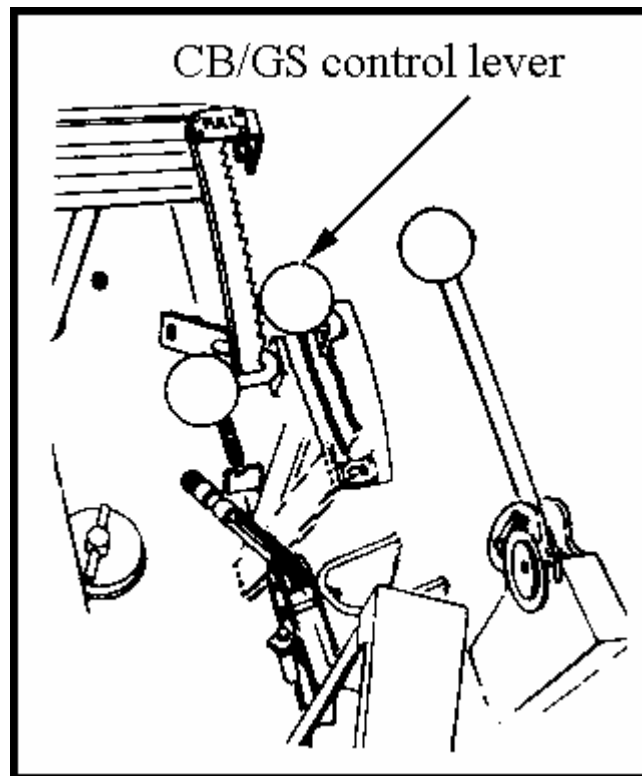


Figure 052-227-1241-2  
CB/GS Control Lever

- (2) The suspension control lever should be in the UNSPRUNG position (Figure 052-227-1241-3).

## Performance Steps

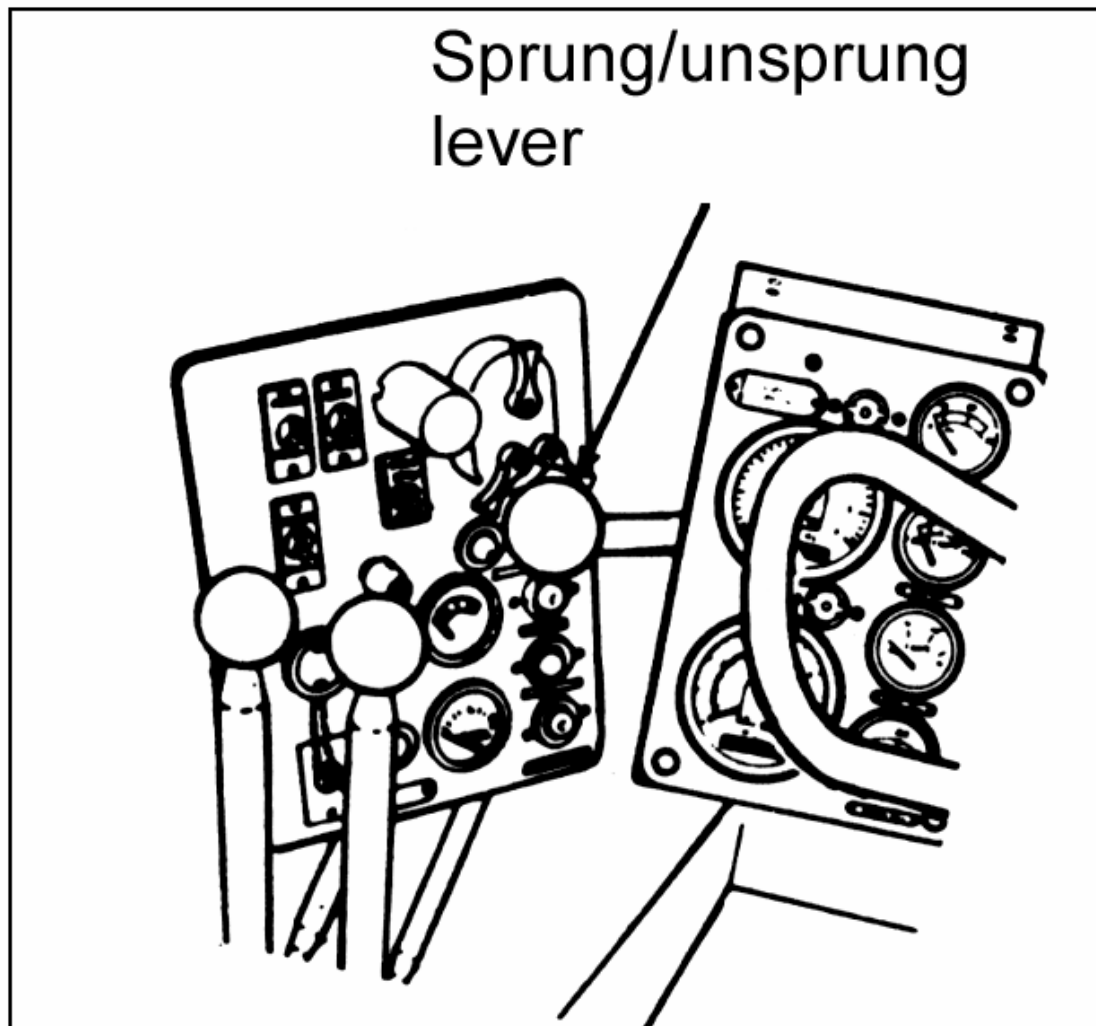


Figure 052-227-1241-3  
Suspension Control Levers

- (3) The transmission should be in the neutral (N) position (Figure 052-227-1241-4).

## Performance Steps

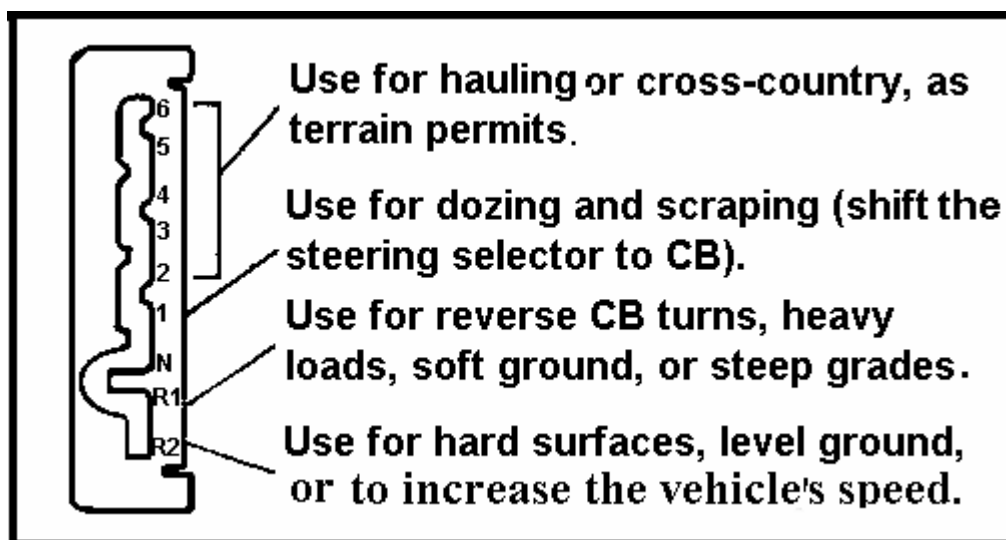


Figure 052-227-1241-4  
Gear Pattern

- (4) The ejector should be in the FORWARD position (Figure 052-227-1241-5).

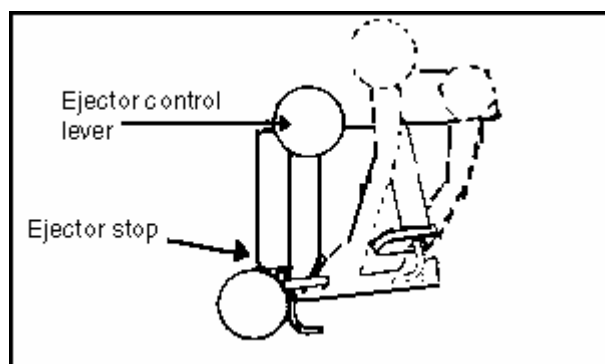


Figure 052-227-1241-5  
Ejector Control Levers

- d. Push the left- and the right-suspension control levers forward, and lower the front of the vehicle until the scraper's cutting edge rests on the ground (Figure 052-227-1241-6).

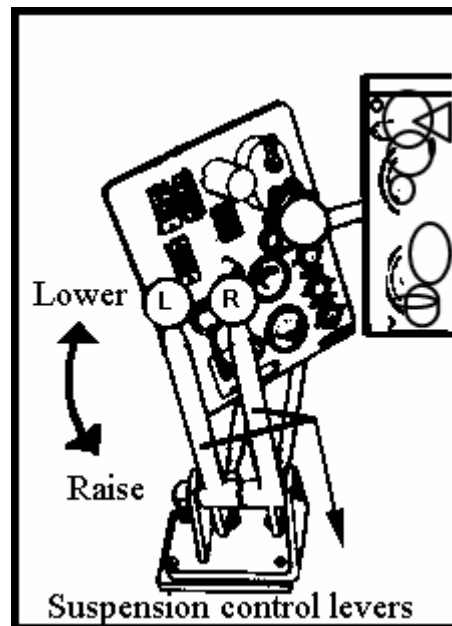
**Performance Steps**

Figure 052-227-1241-6  
Suspension Control Levers Pushed Forward

- e. Attach the chain to the palletized cargo and the lifting eye on the ejector (Figure 052-227-1241-7).

## Performance Steps

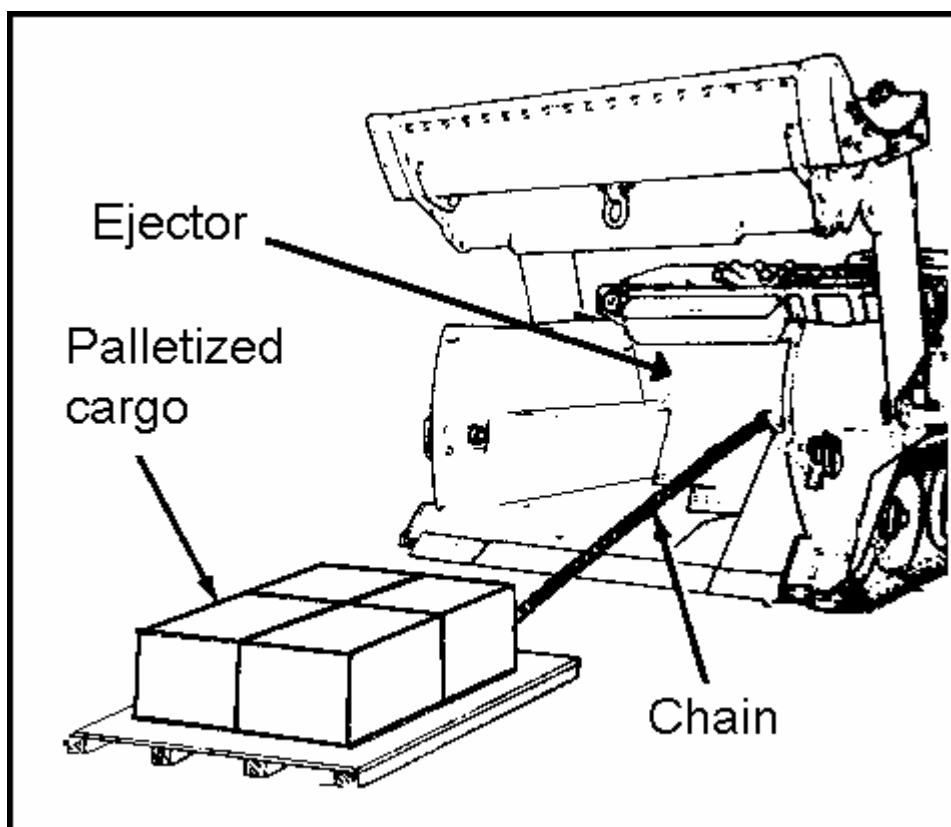


Figure 052-227-1241-7  
Palletized Cargo

- f. Retract the ejector slowly until the palletized cargo is pulled into the bowl. If necessary, move the ejector forward, shorten the chain, and pull the palletized cargo into the bowl.
- g. Disconnect the chain from the ejector. Instruct the assistant to remove the two apron lock pins. Raise the front of the vehicle, and lower the apron. Place the suspension control lever in the SPRUNG position.
- h. Stow the chain.

4. Unload the palletized cargo.

- a. Push the apron control lever forward, and raise the apron to the full open position. Instruct the assistant to install the apron lock pins.

**WARNING: DO NOT OPERATE THE EJECTOR WHEN PERSONNEL ARE IN THE BOWL, UNLESS THE EJECTOR LOCK IS ENGAGED. DO NOT WORK UNDER THE VEHICLE UNLESS THE HULL IS BLOCKED AND THE APRON LOCK PINS ARE INSTALLED. SEVERE INJURY OR DEATH TO PERSONNEL MAY RESULT.**

- b. Place the suspension control lever in the UNSPRUNG position.
- c. Push the left- and the right-suspension control levers forward, and lower the front of the vehicle until the scraper's cutting edge rests on the ground.
- d. Move the ejector control lever slowly forward until the ejector pushes the palletized cargo out of the bowl.

**NOTE:** If the palletized cargo gets caught on the edge of the bowl, slowly back away the vehicle.

- e. Instruct the assistant to remove the apron lock pins. Raise the front of the vehicle, place the suspension control lever in the SPRUNG position, and lower the apron.

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions.

Brief soldier: The assistant is only to assist the soldier when instructed to do so and can only perform the steps covered in the training information outline.

<b>Performance Measures</b>	<b><u>GO</u></b>	<b><u>NO GO</u></b>
1. Started the ACE's engine and allowed it to warm-up for 3 to 5 minutes.	_____	_____
2. Removed the chain from the apron stowage.	_____	_____
3. Loaded the palletized cargo.	_____	_____
4. Unloaded the palletized cargo.	_____	_____

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

#### **References**

##### **Required**

##### **Related**

LO 5-2350-262-12

TM 5-2350-262-10

**Conduct Recovery Operations with an Armored Combat Earthmover (ACE), M9**  
**052-227-1250**

**Conditions:** As an ACE operator in a field environment, given a mired or bellied ACE, basic-issue items (BII)s, leather gloves, an assistant, and a suitable area with an anchor point.

**Standards:** Recover the ACE without causing injury to personnel or equipment damage.

**Performance Steps**

1. Attach the tow bar to the tow shackles on the rear of the ACE to perform vehicle recovery operations (Figure 052-227-1250-1). There are no suitable attachment points on the front of the ACE.

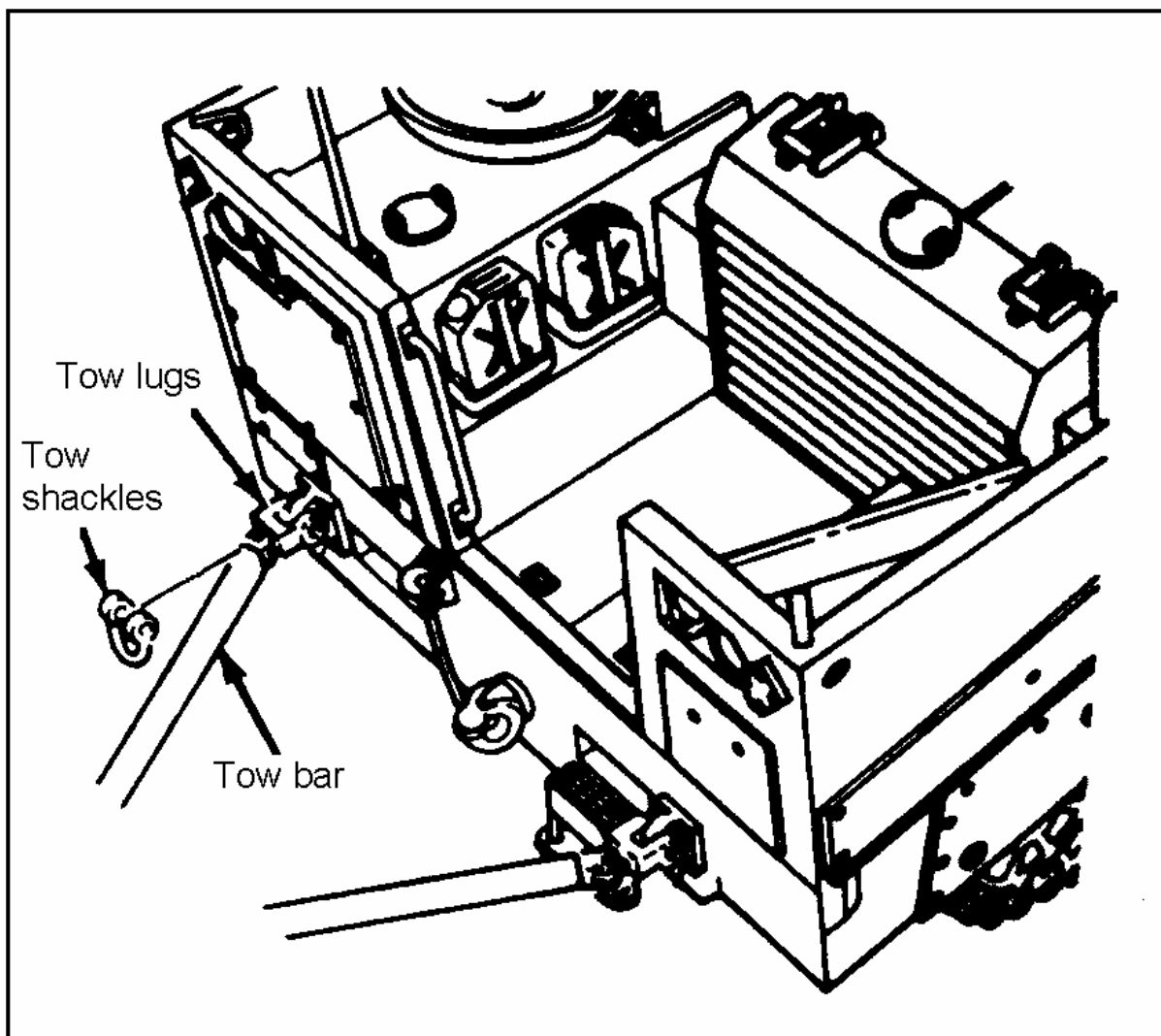


Figure 052-227-1250-1  
Tow-Bar Connection

**CAUTION:** PERSONNEL CAN BE INJURED AND EQUIPMENT MAY BE DAMAGED IF THE CORRECT RECOVERY PROCEDURES ARE NOT FOLLOWED.

2. Use the winch to perform vehicle recovery operations on a mired or bellied ACE.

**Performance Steps**

NOTE: Always keep the winch cable in line with the centerline of the vehicle.

- a. Unload the bowl, if necessary, and prepare the vehicle for winch operations. (Refer to Task 052-227-1103 to operate the winch on the ACE.)
- b. Set the winch shift lever in the L position, and shift the vehicle's transmission to the reverse first (R1) position.
- c. Coordinate the operation of the accelerator and the winch control lever, slacken the winch cable, and drive the vehicle backward.
- d. Retract and stow the winch cable. (Refer to Task 052-227-1103 to stow the winch cable on the ACE.)

NOTE: Use the lifting eyes, located on the four corners of the ACE, when lifting the ACE with a crane or a recovery vehicle with lifting capabilities.

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions. Evaluate the soldier on vehicle recovery operations using the winch. The vehicle does not have to be mired or bellied in order to evaluate the task.

Brief soldier: Inform the soldier that he will be evaluated on the overall performance of the task. The assistant is only to assist the soldier when instructed to do so and can only perform the steps covered in the training information outline.

**Performance Measures**

	<u><b>GO</b></u>	<u><b>NO GO</b></u>
1. Preformed vehicle recovery operations using a tow bar and the ACE's tow shackles.	—	—
2. Performed vehicle recovery operations using the winch.	—	—

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

**References****Required****Related**

TM 5-2350-262-10



## Subject Area 7: Basic Nuclear, Biological, Chemical (NBC) Operations

**Operate a Nuclear, Biological, Chemical (NBC) System****052-227-1135**

**Conditions:** As an armored vehicle-launched bridge (AVLB) or armored combat earthmover (ACE) operator in a field environment, given an AVLB or an ACE with a functional gas-particulate filter unit and the appropriate protective mask.

**Standards:** Connect the protective mask to the filter unit. Ensure the proper airflow conditions. Allow the air to heat (in units equipped with an air heater). Disconnect the mask from the filter unit, and shut off the unit. Avoid injury to personnel and equipment damage.

**Performance Steps**

**NOTE:** The location of the switches and the gas-particulate filter unit will vary depending on the vehicle type.

1. Place the protective mask on the face, and adjust as necessary.
2. Turn the vehicle's master switch to the ON position.
3. Slide the spring clip off the air-intake holes in the gas-particulate filter unit until the openings are uncovered (Figure 052-227-1135-1).

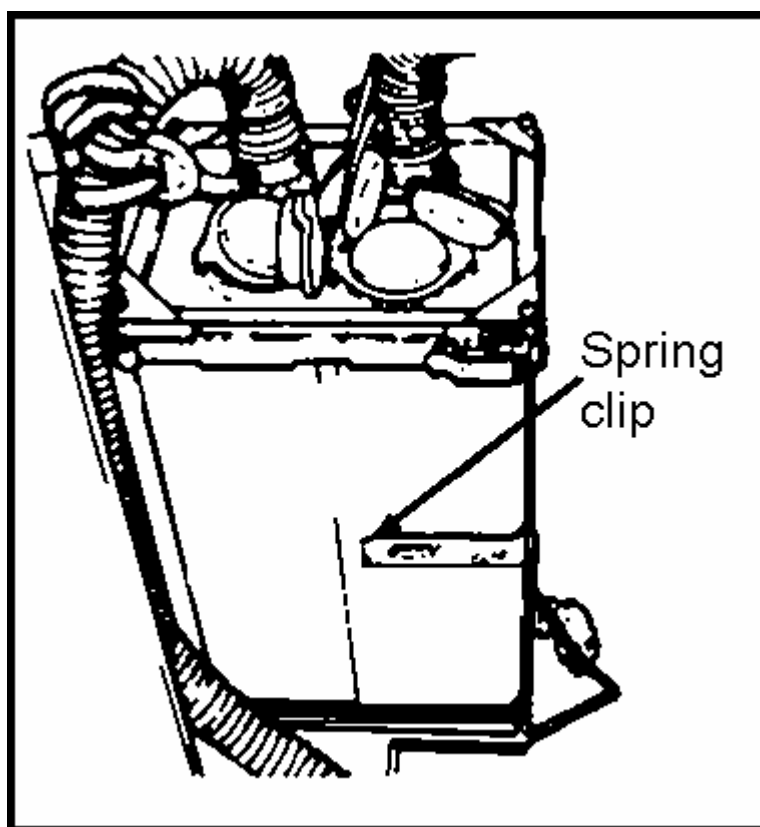


Figure 052-227-1135-1  
Gas-Particulate Filter Unit

4. Set the gas-particulate or the air-purifier switch to the ON position.

**Performance Steps**

5. Disconnect the hose assembly from the connector, and connect the hose to the protective-mask canister (Figure 052-227-1135-2).

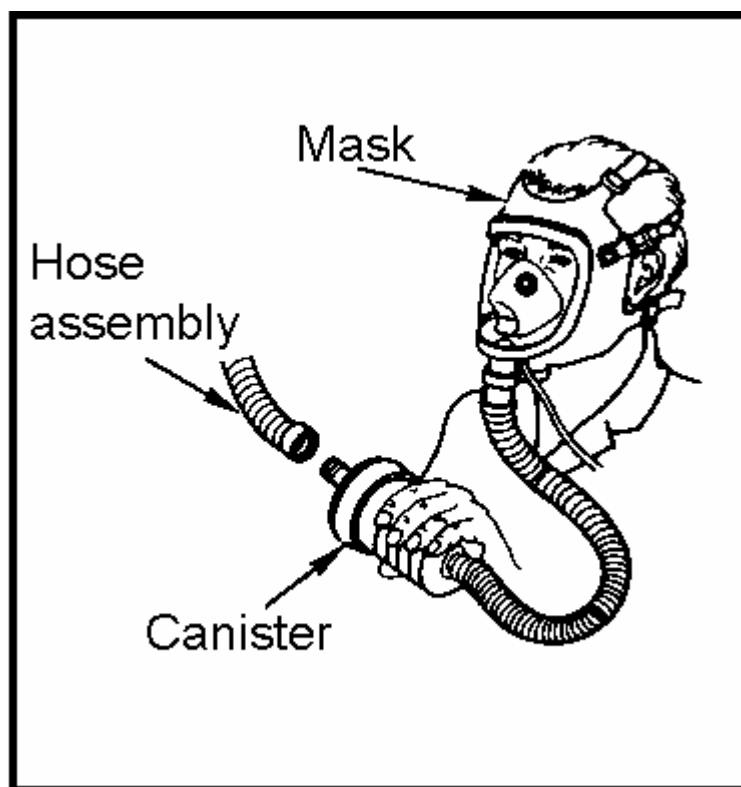


Figure 052-227-1135-2  
Connecting the Hose to the Canister

**WARNING:** FROSTBITE TO THE CHEEKBONE AREA OF THE FACE MAY OCCUR FROM SUBFREEZING AIR DELIVERED BY THE FILTER UNIT. DO NOT CONNECT THE PROTECTIVE MASK TO THE FILTER-UNIT HOSE UNLESS THE EXISTING AIR TEMPERATURE IS ABOVE FREEZING, OR THE UNIT IS EQUIPPED WITH AN AIR HEATER.

6. Turn on the air heater if the temperature of the air to be breathed is 15 degrees Fahrenheit (F) (-9 degrees Celsius[C]) or lower (Figure 052-227-1135-3).

## Performance Steps

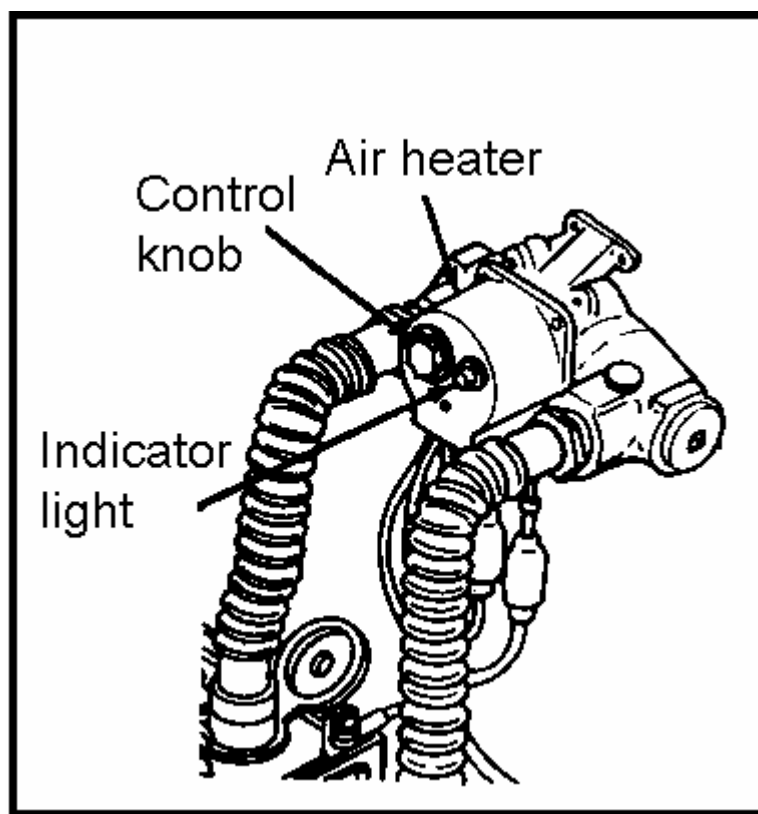


Figure 052-227-1135-3  
Air Heater

- a. Increase the air temperature by turning the air-control knob clockwise until the indicator light comes on.
- b. Decrease the air temperature by turning the air-control knob counterclockwise.

NOTE: The heater light will blink when the proper air temperature is achieved.

**WARNING:** TO AVOID DAMAGE TO THE AIR HEATER, TURN THE AIR HEATER OFF BEFORE TURNING OFF THE GAS-PARTICULATE FILTER OR THE AIR PURIFIER.

7. Discontinue use of the NBC system.
  - a. Remove the protective mask.
  - b. Disconnect the hose assembly from the canister.
  - c. Turn the air-control knob completely counterclockwise.
  - d. Turn the gas-particulate or the air-purifier switch to the OFF position.
  - e. Connect the hose assembly to the connector.

8. Turn the vehicle's master switch to the OFF position.

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions.

**Brief soldier:** Tell the soldier that he will be required to complete the performance measures according to the standards set forth in this task.

## Performance Measures

1. Placed the protective mask on the face and adjusted the fit as necessary.

**GO**    **NO GO**

—       —

**Performance Measures**

	<b><u>GO</u></b>	<b><u>NO GO</u></b>
2. Turned the vehicle's master switch to the ON position.	_____	_____
3. Slid the spring clip off of the air-intake holes on the filter unit.	_____	_____
4. Set the gas-particulate or the air-purifier switch to the ON position.	_____	_____
5. Disconnected the hose assembly from the connector and connected the hose to the protective-mask canister.	_____	_____
6. Adjusted the air temperature as necessary.	_____	_____
7. Discontinued use of the NBC system.	_____	_____
8. Turned the vehicle's master switch to the OFF position.	_____	_____

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

**References****Required****Related**

TM 5-2350-262-10

TM 5-5420-226-10

## Subject Area 8: Basic Gunnery Operations

**Load an M239 Grenade Launcher on an Armored-Vehicle-Launched Bridge (AVLB)/Armored Combat Earthmover (ACE), M9**  
**052-225-1101**

**Conditions:** As an AVLB or ACE operator in a field environment, given an AVLB (an M48 or M60 tank chassis) or an ACE equipped with a functional M239 smoke-grenade launcher system, basic-issue items (BIs), smoke grenades, and a suitable working area.

**Standards:** Load the M239 smoke-grenade launcher with smoke grenades, and ensure that the grenades are engaged and secured. Avoid injury to personnel and equipment damage.

**Performance Steps**

WARNING: FOLLOW THE ESTABLISHED AMMUNITION HANDLING PROCEDURES WHEN HANDLING, LOADING, AND UNLOADING THE GRENADES. SMOKE GRENADES CONTAIN RED PHOSPHORUS (RP), WHICH IS A FIRE HAZARD AND DANGEROUS TO PERSONNEL OUTSIDE OF THE VEHICLE. NEVER PLACE ANY PART OF YOUR BODY IN FRONT OF THE LAUNCHER WHEN LOADING GRENADES, UNLOADING GRENADES, OR REPLACING OR REMOVING THE COVERS. SMOKE GRENADES CAN EXPLODE, BURN, AND CAUSE SERIOUS INJURIES DUE TO THE ELECTRICITY AND THE HEAT. BEFORE STOWING, LOADING, OR UNLOADING THE SMOKE GRENADES, ENSURE THAT ALL OF THE POWER SWITCHES ARE IN THE OFF POSITION, AND THE PORTABLE FIRE EXTINGUISHER IS AVAILABLE NEARBY.

1. Load the M239 smoke-grenade launcher on an AVLB.
  - a. Ensure that the vehicle's master-power switch and the grenade-power switch are set to the OFF position (Figure 052-225-1101-1).

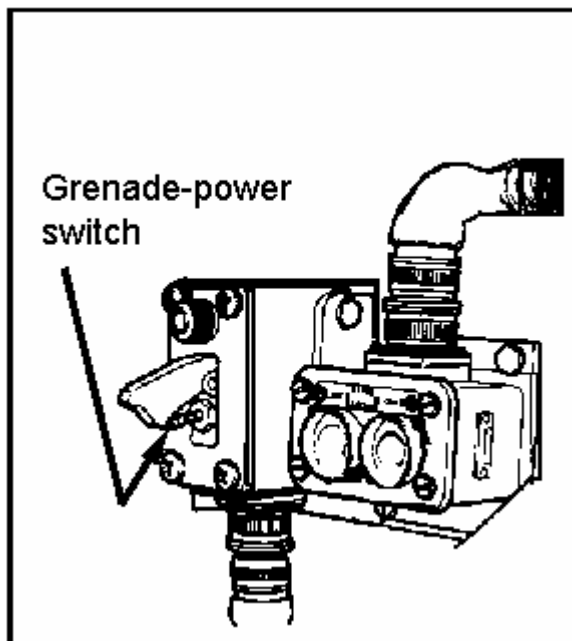


Figure 052-225-1101-1  
AVLB Grenade-Power Switch

- b. Remove the canvas covers from both dischargers and stow them in the fender stowage box.
    - c. Ensure that the barrels of each discharger are clear of rust and debris.
    - d. Remove the grenades from the stowage boxes (Figure 052-225-1101-2).

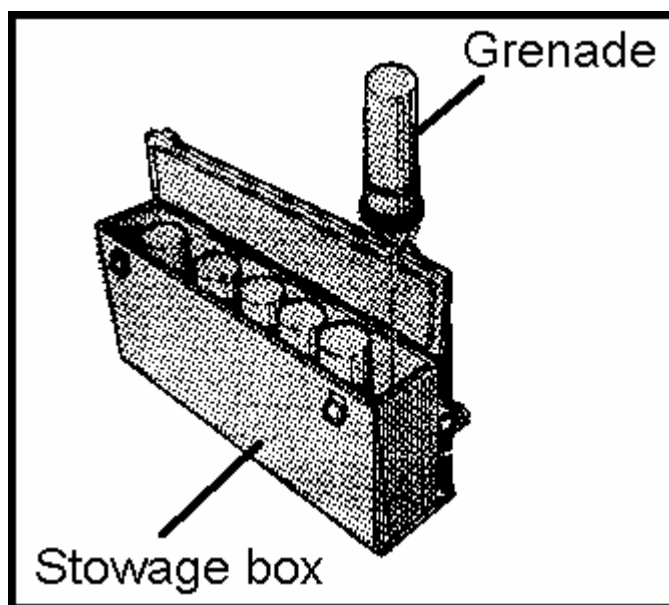
**Performance Steps**

Figure 052-225-1101-2  
AVLB Grenade Stowage Box

WARNING: DO NOT USE GRENADES THAT HAVE EXTERNAL CRACKS, DENTS, OR OTHER DEFORMITIES. DO NOT TRY TO DISASSEMBLE THE GRENADES. PLACE THE DAMAGED GRENADES IN THEIR STOWAGE OR SHIPPING CONTAINERS. DISPOSE OF THEM ACCORDING TO THE LOCAL REGULATIONS.

- e. Push the grenade, base first, into the barrel of the discharger. The spring clip on the grenade's base must engage the tip plug at the bottom of each barrel (Figure 052-225-1101-3).

## Performance Steps

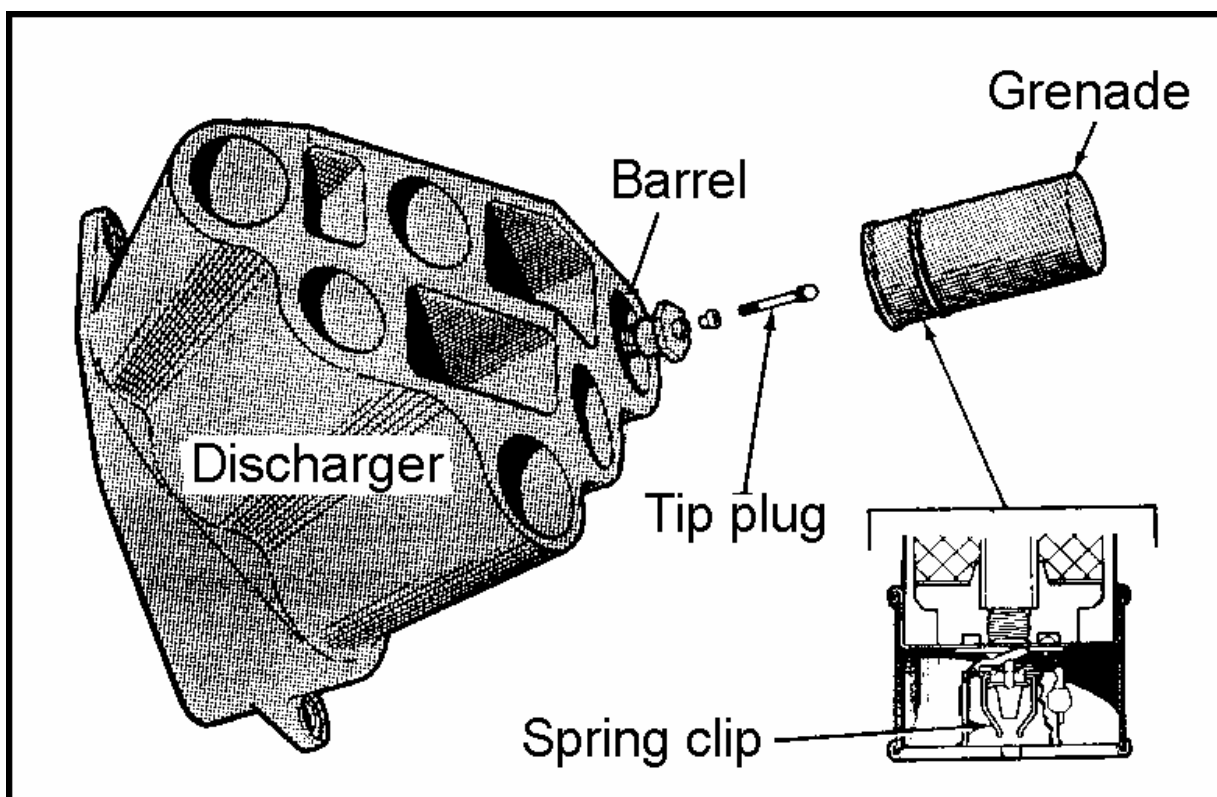


Figure 052-225-1101-3  
AVLB Grenade Discharger

- f. Rotate the grenade 1/4 to 1/2 turn in either direction, ensuring electrical contact.
- g. Continue this process until all barrels are loaded.
- h. Replace the canvas covers on the dischargers until the grenade is ready for firing or unloading.

**WARNING:** DO NOT STAND IN FRONT OF, OR PLACE ANY BODY PART IN FRONT OF, THE DISCHARGES WHILE REPLACING OR REMOVING THE CANVAS COVER ON THE LOADED DISCHARGERS.

2. Load the M239 smoke-grenade launcher on an ACE.
  - a. Ensure that the vehicle's master-power switch and grenade arming switch are set to the OFF position (Figure 052-225-1101-4).

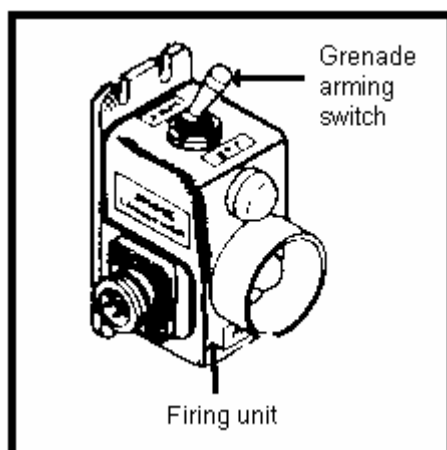
**Performance Steps**

Figure 052-225-1101-4  
ACE Grenade Arming Switch

- b. Remove the smoke grenades from the shipping container.
- WARNING: DO NOT USE GRENADES THAT HAVE EXTERNAL CRACKS, DENTS, OR OTHER DEFORMITIES. DO NOT TRY TO DISASSEMBLE THE GRENADES. PLACE THE DAMAGED GRENADES IN THEIR STOWAGE OR SHIPPING CONTAINERS, AND DISPOSE OF THEM IN ACCORDING TO THE LOCAL REGULATIONS.
- c. Remove the rubber caps from the eight tubes on the smoke grenade dischargers (Figure 052-225-1101-5).
  - d. Gently push down on the grenade until you hear or feel two clicks. The smoke grenade should be securely seated on the firing pin. Carefully place the smoke grenade, metal end first, into the tube (Figure 052-225-1101-5).



## Performance Steps

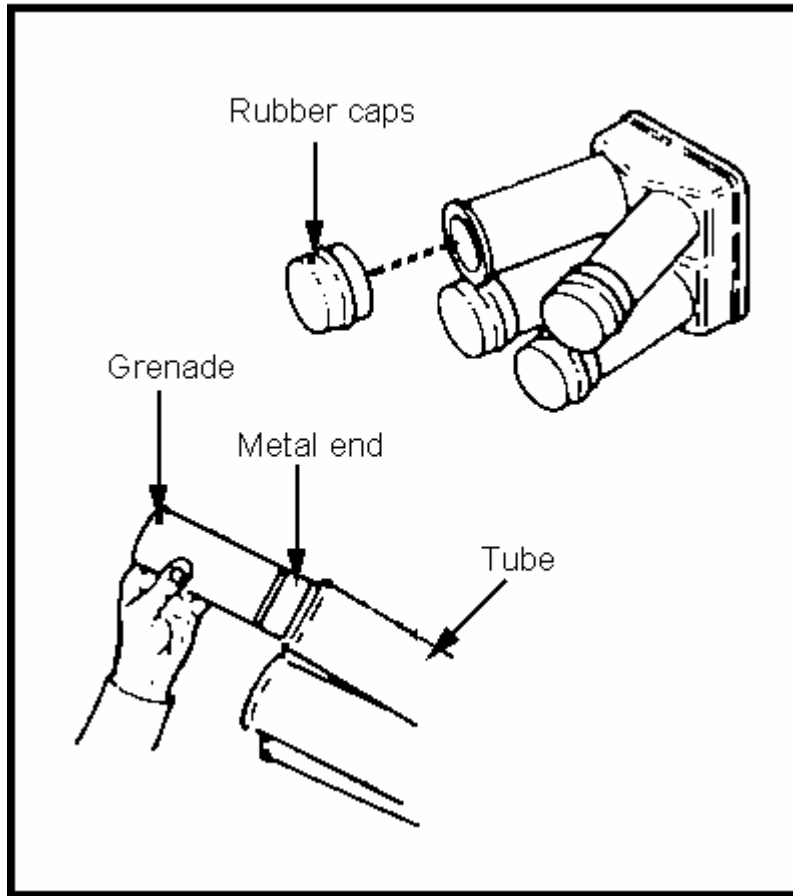


Figure 052-225-1101-5  
ACE Grenade Discharger Tubes

- e. Turn the smoke grenade 1/2 turn to ensure a good electrical contact.
- f. Continue this process until all of the barrels are loaded.

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions.

Brief soldier: Tell the soldier he will be required to complete the performance measures according to the standards set forth in this task.

### Performance Measures

1. Loaded the M239 smoke-grenade launcher on the AVL B.
2. Loaded the M239 smoke-grenade launcher on the ACE.

**GO**    **NO GO**

\_\_\_\_    \_\_\_\_  
\_\_\_\_    \_\_\_\_

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

### References

Required

### Related

TM 5-5420-226-10

**Unload an M239 Grenade Launcher on an Armored-Vehicle-Launched Bridge (AVLB)/Armored  
Combat Earthmover (ACE), M9  
052-225-1102**

**Conditions:** As an AVLB or an ACE operator in a field environment, given an AVLB (an M48 or M60 tank chassis) or an ACE equipped with a functional and loaded M239 smoke-grenade launcher system, basic-issue items (BIIIs), and a suitable working area.

**Standards:** Unload the smoke grenades from the M239 smoke-grenade launcher without causing injury to personnel or equipment damage.

**Performance Steps**

**WARNING:** FOLLOW THE ESTABLISHED AMMUNITION HANDLING PROCEDURES WHEN HANDLING, LOADING, AND UNLOADING THE GRENADES. SMOKE GRENADES CONTAIN RED PHOSPHORUS (RP), WHICH IS A FIRE HAZARD AND DANGEROUS TO PERSONNEL OUTSIDE OF THE VEHICLE. NEVER PLACE ANY PART OF YOUR BODY IN FRONT OF THE LAUNCHER WHEN LOADING GRENADES, UNLOADING GRENADES, OR REPLACING OR REMOVING THE COVERS. SMOKE GRENADES CAN EXPLODE, BURN, AND CAUSE SERIOUS INJURIES DUE TO THE ELECTRICITY AND THE HEAT. BEFORE STOWING, LOADING, OR UNLOADING SMOKE GRENADES, ENSURE THAT ALL POWER SWITCHES ARE IN THE OFF POSITION, AND A PORTABLE FIRE EXTINGUISHER IS NEARBY.

1. Unload the M239 smoke-grenade launcher from an AVLB.
  - a. Ensure that the vehicle's master-power and grenade-power switches are in the OFF position.
  - b. Remove the canvas covers from both dischargers (if installed).

**WARNING:** DO NOT STAND IN FRONT OF, OR PUT ANY PART OF YOUR BODY IN FRONT OF, THE LOADED DISCHARGERS WHEN REPLACING OR REMOVING THE CANVAS COVERS.

- c. Unlatch and open the right and left stowage boxes.
- d. Remove all of the grenades from both grenade dischargers and both stowage boxes.
- e. Return all of the grenades to the ammunition stowage containers, and place the containers in the stowage box.
- f. Close and latch both stowage boxes.
- g. Install the covers on both grenade launchers.

2. Unload the M239 smoke-grenade launcher from an ACE.
  - a. Ensure that the vehicle's master-power and grenade arm switches are in the OFF position.
  - b. Remove the rubber caps from the eight tubes on the smoke-grenade dischargers (if installed).

**WARNING:** DO NOT STAND IN FRONT OF, OR PUT ANY PART OF YOUR BODY IN FRONT OF, THE LOADED DISCHARGERS WHEN REPLACING OR REMOVING THE CANVAS COVERS.

- c. Remove the smoke grenades from the tubes. Hold the smoke grenade from the side, and carefully pull and twist from the tube.
- d. Replace the smoke grenade in the stowage containers.
- e. Replace the rubber caps on the eight tubes on the smoke-grenade dischargers.

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions.

**Brief soldier:** Tell the soldier that he will be required to complete the performance measures according to the standards set forth in this task.

**Performance Measures**

	<u><b>GO</b></u>	<u><b>NO GO</b></u>
1. Unloaded the M239 smoke-grenade launcher from the AVLB.	—	—
2. Unloaded the M239 smoke-grenade launcher from the ACE.	—	—

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

**References  
Required**

**Related**

TM 5-2350-262-10  
TM 5-5420-226-10

**Maintain an M9 Pistol****071-004-0001**

**Conditions:** Given an M9 pistol; magazine; bore brush; cleaning brush; M4 cleaning rod; cleaning patches; small-arms swabs; clean, dry cloths; cleaner, lubricant, preservative (CLP), and a requirement to maintain the M9 pistol.

**Standards:** The pistol is disassembled, cleaned, lubricated, assembled, and is operational.

**Performance Steps**

1. Clear the pistol.
  - a. Place the safety lever in the SAFE position.
  - b. Hold the pistol in the raised pistol position.
  - c. Depress the magazine release button; remove the magazine from the pistol.
  - d. Pull the slide to the rear; remove any chambered round.
  - e. Push the slide stop up, locking the slide to the rear.
  - f. Look into the chamber to ensure that it is empty.
2. Disassemble the pistol and magazine.
  - a. Depress the slide stop and let the slide go forward.
  - b. With your right hand, hold the pistol with the muzzle slightly raised.
  - c. With your forefinger, press the disassembly lever button (Figure 1).

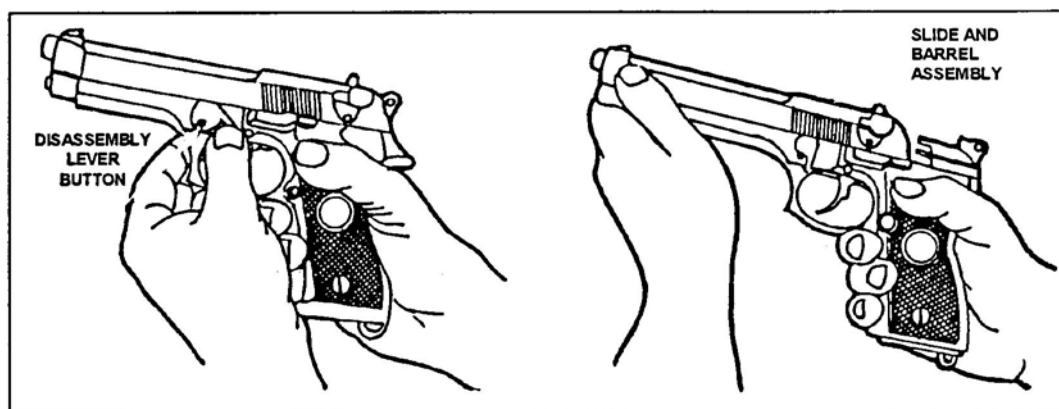


Figure 1. Disassembly lever button.

- d. Rotate the disassembly lever downward until it stops.
- e. Pull the slide and barrel assembly forward (Figure 1), and remove it from the receiver.
- f. Slightly compress the recoil spring and spring guide. At the same time, lift them up and remove them, allowing the recoil spring to stretch slowly (Figure 2).

## Performance Steps

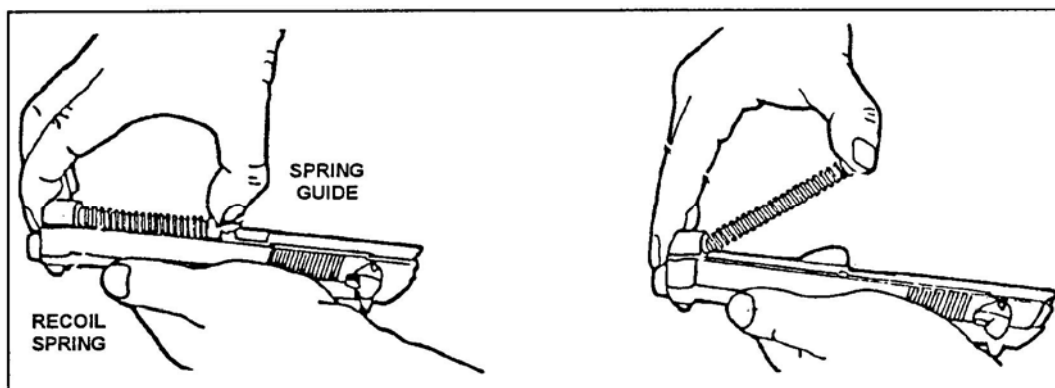


Figure 2. Removal of the recoil spring and spring guide.

- g. Separate the recoil spring from the spring guide.
- h. Push in on the locking block plunger while pushing the barrel forward slightly. Lift and remove the locking block and barrel assembly from the slide (Figure 3).

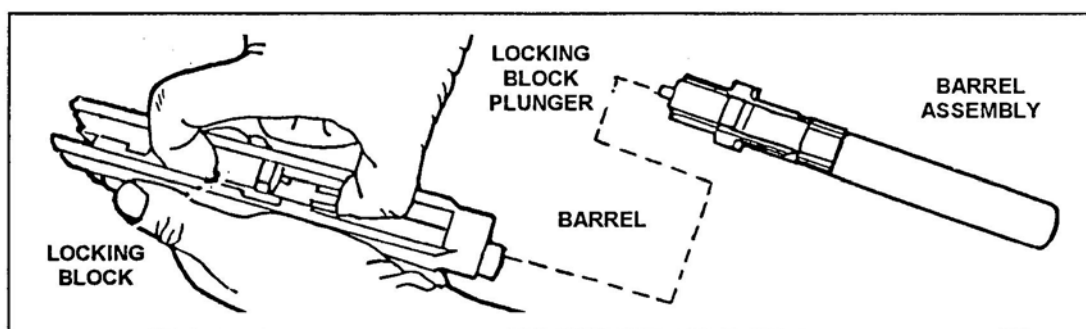


Figure 3. Removal of the locking block and barrel assembly.

- i. Disassemble the magazine (Figure 4).

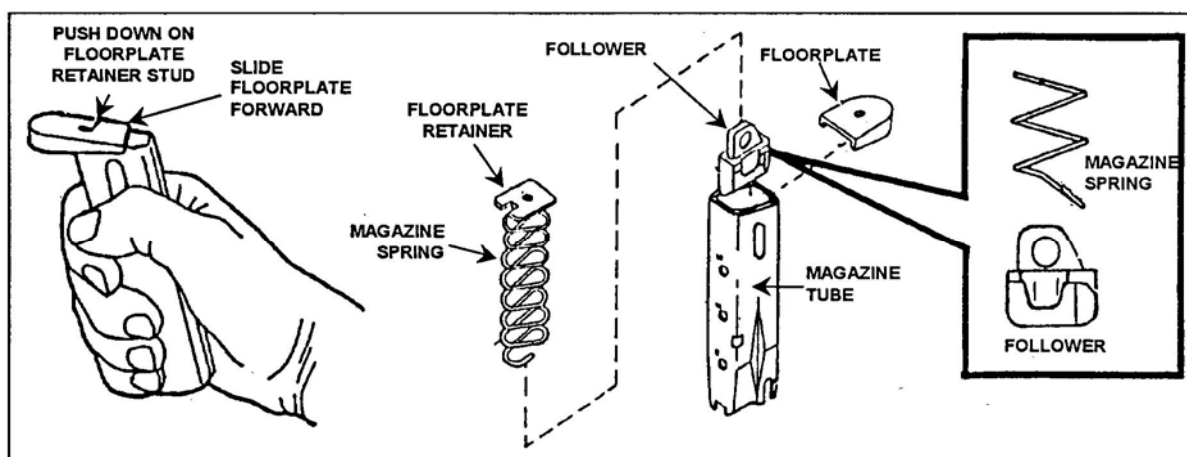


Figure 4. Disassembly of the magazine.

- (1) Grasp the magazine firmly, with the floor plate up and the back of the magazine tube against the palm of your hand.

**Performance Steps**

- (2) Depress the locking block to make the locking block plunger protrude.
- (3) Using the locking block plunger, push down on the floor plate retainer stud.
- (4) Slide the floor plate slightly forward with your thumb.
- (5) While removing the floor plate, use your thumb to keep pressure on the magazine spring.
- (6) Remove the floor plate retainer, the magazine spring, and the follower from the magazine tube.
- (7) Remove the magazine spring from the follower.
- (8) Remove the floor plate retainer from the magazine spring.

## 3. Clean the pistol and magazine.

**CAUTION**

Use the bore brush to clean only the bore. Using it on any other part of the pistol will cause damage.

## a. Slide assembly.

- (1) Clean slide assembly with a cloth. Use CLP on a soft brush to remove excess dirt and carbon.
- (2) Wipe dry with a clean cloth.

## b. Barrel assembly.

- (1) Attach a bore brush to a cleaning rod. Moisten the bore brush with CLP and insert it into the chamber end of the barrel. Make sure the brush completely clears the muzzle before you pull it back through the bore. Repeat this procedure several times to loosen carbon deposits.
- (2) To clean and dry the barrel, push a clean swab through the bore. Repeat as necessary with fresh swabs until a swab comes out clean.
- (3) Clean locking block with a soft brush.
- (4) Clean the recoil spring and spring guide with CLP and a soft brush or cloth.

## c. Receiver assembly. Wipe the receiver assembly clean with a cloth and, if needed, a soft brush.

## d. Magazine (Figure 4).

- (1) Wipe the magazine tube and the follower with CLP, a cloth, and a soft brush.
- (2) Clean the magazine spring, floor plate retainer, and floor plate with a clean cloth.

## e. Holster. Remove dirt from exterior with stiff brush. Wipe interior with clean cloth.

## f. Ammunition. If ammunition gets wet or dirty, clean it and remove corrosion from it at once using a dry cloth.

## 4. Inspect for serviceability.

## a. Slide assembly.

- (1) Check to ensure the ambidextrous safety moves freely.
- (2) Check the firing block for damage.
- (3) Check the rear sight for looseness.

## b. Barrel assembly.

- (1) Inspect the bore and chamber for pitting or obstructions.
- (2) Check the locking block plunger to ensure the locking block moves freely.
- (3) Inspect the locking lugs for cracks and burrs.

## c. Recoil spring and recoil spring guide.

- (1) Check recoil spring to ensure it is not bent or damaged.
- (2) Check recoil spring to ensure it is straight and free of cracks and burrs.

## d. Receiver assembly.

- (1) Check for bends, chips, and cracks.
- (2) Check to ensure the slide stop and magazine stop move freely.
- (3) Check the guide rails for excessive wear, burr, cracks, or chips.

## e. Magazine assembly (Figure 4).

- (1) Check for damage to the spring and follower.
- (2) Inspect magazine lips to ensure they are not bent excessively and to ensure they have no cracks and burrs.

**Performance Steps**

- (3) Check to ensure the magazine tube is not bent.
- f. Ammunition.
  - (1) Check for damaged or corroded ammunition. Turn in heavily corroded or damaged ammunition.
  - (2) Check to ensure ammunition is free of oil and grease.

5. Lubricate the pistol and magazine.

**NOTES:**

- 1. CLP, LSA, and LAW are the only lubricants authorized for this pistol.
- 2. You can use CLP and LSA interchangeably.
- 3. Before firing, remove excess lubricant from the bore.
  - a. Lubricate all parts with a light coat of LSA or CLP at temperatures above -10 degrees Fahrenheit, or LAW at temperatures below +10 degrees Fahrenheit.
  - b. Do not mix LAW with other lubricants.
- 6. Assemble the pistol (Figure 5).

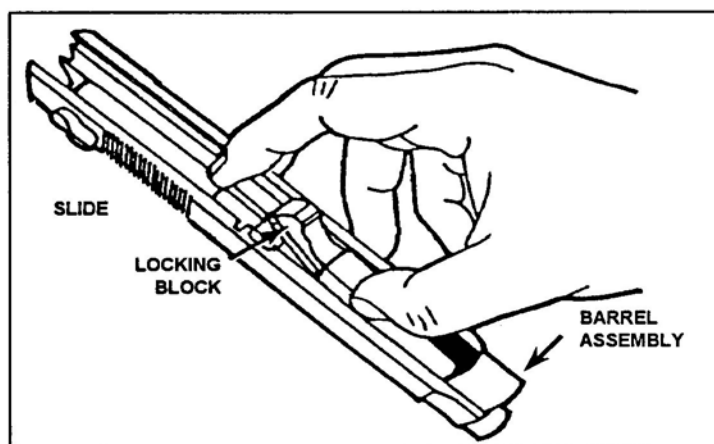


Figure 5. Insertion of the barrel assembly.

- a. Grasp the slide with the bottom facing up.
- b. With the other hand, grasp the barrel assembly with the locking block facing up.
- c. Insert the muzzle into the forward end of the slide. At the same time, lower the rear of the barrel assembly by moving the barrel slightly downward with light thumb pressure. The barrel will fall into place.
- d. Insert the recoil spring guide into the recoil spring (Figure 6).

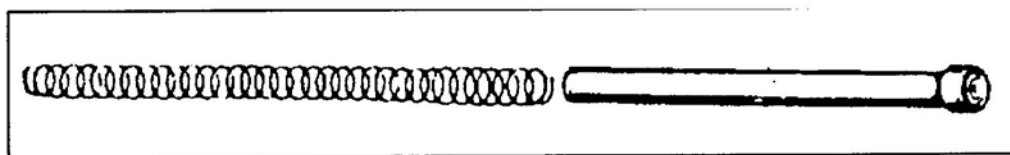


Figure 6. Recoil spring and spring guide.

- e. Insert the end of the recoil spring and the recoil spring guide into the recoil spring housing. At the same time, compress the recoil spring and lower the spring guide until it is fully seated on the locking block cutaway (Figure 7).

## Performance Steps

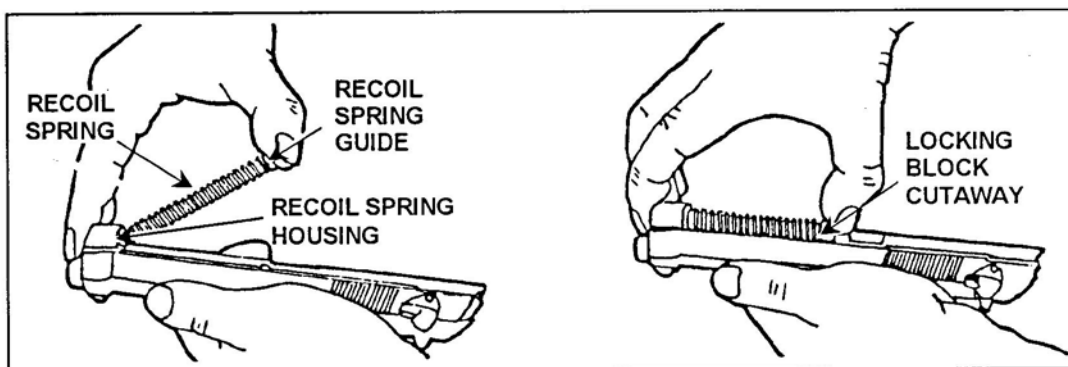


Figure 7. Insertion of the recoil spring and guide.

### CAUTION

Be sure that the hammer is uncocked and firing pin block lever is in the down position. If the hammer is cocked, carefully and manually lower the hammer. Do not pull the trigger while placing the slide onto the receiver.

- f. Push the firing pin block lever down. Grasp the slide and barrel assembly with the sights up, and align the slide on the receiver assembly guide rails (Figure 8).

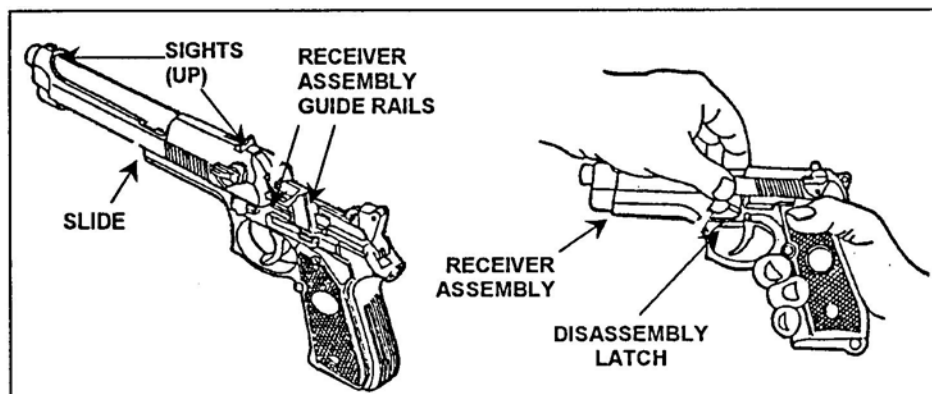


Figure 8. Final assembly.

- g. Push until the rear of the slide is a short distance beyond the rear of the receiver assembly and hold. At the same time, rotate the disassembly latch lever upward. A click indicates a positive lock (Figure 8).
- h. Assemble the magazine (Figure 4).
  - (1) Insert the follower into the top coil of the magazine spring. Make sure the notches on the follower and magazine tube are on the same side.
  - (2) Insert the magazine spring with follower into magazine tube.
  - (3) Turn the magazine bottom up, with its back side against the palm of the hand. Attach and center the floor plate retainer on the bottom spring coil.

### CAUTION

After inserting the magazine spring, keep tension on it with your thumb. Be careful not to place the lips of the magazine tube on a hard surface while you reassemble the magazine.

- (4) Push and hold the magazine spring and floor plate retainer down. At the same time, slide the floor plate over the side walls until it seats fully.
- (5) Carefully insert the magazine into the pistol well. You will hear a click when it locks into position.



**Performance Steps****WARNING**

Make sure the pistol is clear and unloaded.

7. Perform a function check.

**Evaluation Preparation:** Setup: At the test site, provide a field table with all the equipment given in the task condition statement.

**Brief Soldier:** Tell the soldier that he must clear, disassemble, clean, inspect, lubricate, assemble, and perform a function check on the weapon.

**Performance Measures****GO**    **NO GO**

- |  |       |       |
|--|-------|-------|
| 1. Clear the pistol.   | _____ | _____ |
| 2. Disassemble the pistol and magazine without damaging any parts. | _____ | _____ |
| 3. Clean the pistol, components, and ammunition.                   | _____ | _____ |
| 4. Inspect the pistol, components, and ammunition for defects.     | _____ | _____ |
| 5. Lubricate pistol and magazine correctly.                        | _____ | _____ |
| 6. Assemble pistol and magazine in correct sequence correctly.     | _____ | _____ |
| 7. Perform a function check.                                       | _____ | _____ |

**Evaluation Guidance:** If the soldier passes all steps, score him GO. If he fails any steps, score him NO-GO, then show him what he did wrong and how to do it correctly.

**Load an M9 Pistol**  
**071-004-0003**

**Conditions:** Given an M9 pistol, a magazine loaded with 9-mm ammunition, and a requirement to load the pistol.

**Standards:** Seat the magazine fully in the magazine well and chamber a round.

**Performance Steps**

**WARNING**

The M9 pistol has single and double action firing modes. When the safety is set to FIRE, squeezing the trigger will automatically cock and fire the pistol (this is the double-action mode).

Keep your finger away from the trigger until you intend to fire.

1. Place safety lever in SAFE position.
2. Insert the loaded magazine into the pistol's magazine well until you hear a click when the magazine seats fully.
3. Point the pistol in a safe direction (usually at the target or skyward).
4. Retract the slide fully and release it. This strips a cartridge from the magazine and chambers it.

**Evaluation Preparation:** Setup: At the test site, provide the equipment listed in the task conditions statement. You can use dummy rounds to evaluate this task.

Brief Soldier: Tell the soldier to load the M9 pistol so it will fire a round when he squeezes the trigger.

**Performance Measures**

	<u><b>GO</b></u>	<u><b>NO GO</b></u>
1. Place the safety lever in SAFE position.	—	—
2. Insert the loaded magazine into the magazine well.	—	—
3. Point the pistol in a safe direction (usually at the target or skyward).	—	—
4. Retract and release the slide to chamber a cartridge from the magazine.	—	—

**Evaluation Guidance:** If the soldier passes all steps, score him GO. If he fails any steps, score him NO-GO, then show him what he did wrong and how to do it correctly.

## Maintain a Caliber .50 M2 Machine Gun

071-022-0001

**Conditions:** During daylight, given a caliber .50 M2 HB machine gun; cleaning kit; rags; cleaner, lubricant, preservative (CLP); and swabs.

**Standards:** Perform general disassembly of the caliber .50 M2 machine gun; inspect, clean, and lubricate all parts; and assemble the machine gun.

### Performance Steps

#### 1. Disassembly (Figure 0001-1).

##### 1. Clear the caliber .50 machine gun.

- a. Unlock the bolt latch release and raise the cover (Figure 1).
- a. Before disassembly, you must clear the gun as follows:
  - (1) Unlock the bolt latch release and raise the cover.
  - (2) Pull the bolt to the rear and examine the chamber and T-slot to ensure they hold no rounds.

**CAUTION:** Do not grasp the barrel bare-handed if the weapon has just been fired.

- b. Pull and lock the bolt to the rear, leaving the retracting slide handle to the rear.
- b. Remove the barrel group.
  - (1) Turn the cover latch shaft lever and raise the cover group.
  - (2) Stand to the left front of the gun and grasp the retracting slide handle with the left hand, palm down.
  - (3) Push the recoiling parts to the rear until the outer lug on the barrel locking spring aligns with the 3/8-inch hole in the right sideplate of the receiver.
    - (a) The barrel can be turned only when the locking lug is aligned with the 3/8-inch hole.
    - (b) Be careful not to damage the threads or barrel-locking notches.
  - (4) Unscrew the barrel and place it on the ground.
    - (a) Allow the bolt to go forward slowly.
- c. Inspect the chamber and T-slot to make sure they hold no rounds.
  - (a) If the bolt is to the rear, push down on the bolt latch release.
  - (b) Let the bolt ride forward by holding the retracting slide handle.
  - (3) The backplate latch and the latch lock are below the buffer tube.
    - (a) Pull the latch lock out and the latch up.
    - (b) Remove the backplate assembly by lifting straight up (Figure 0001-2).
- d. Place a wooden block inside the receiver, between the bolt and the rear of the barrel.
- d. Remove the driving spring rod assembly.
  - (1) The inner and outer driving springs and the driving spring rod are located next to the right sideplate, inside the receiver.
  - (5) If the backplate is off and the driving spring assembly is compressed, the retaining pin on the driving spring rod can slip from its seat in the right sideplate and injure anyone behind the gun.
- e. Insert the cleaning rod in the muzzle end of the barrel until you can see the rod in the receiver. Remove the cleaning rod.
- e. Remove the shoulder headless pin (bolt stud).
  - (1) Grasp the retracting slide handle and quickly jerk it halfway to the rear to free the bolt from the barrel extension.
- f. Grasp the retracting slide handle, press the bolt latch release, and ease the bolt forward. Close the cover.

## Performance Steps

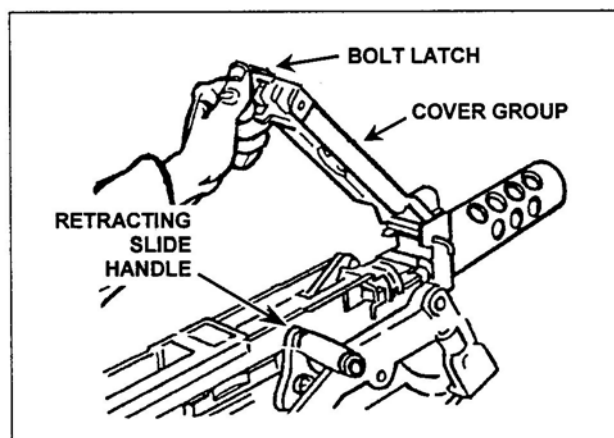


Figure 1. Raising the cover.

- g. Remove the barrel buffer group and the barrel extension group.
2. Disassemble the machine gun.
  - a. Remove the barrel assembly.
    - (1) Raise the cover group (Figure 1).
    - (2) Grasp the retracting slide handle with the right hand, palm up. Pull the bolt to the rear until the barrel locking spring lug aligns with the 3/8-inch hole in the right side plate of the receiver (Figure 2).
    - (3) Place the smallest loop of a caliber .50 link between the trunnion block and the barrel extension (Figure 2). This keeps the barrel locking spring lug aligned with the 3/8-inch hole.
    - (4) Unscrew the barrel from the receiver. Be careful not to damage the threads or barrel locking notches.
    - (5) Remove the caliber .50 link to allow the bolt to go forward slowly. Make sure the bolt group does not slam forward with the barrel removed.

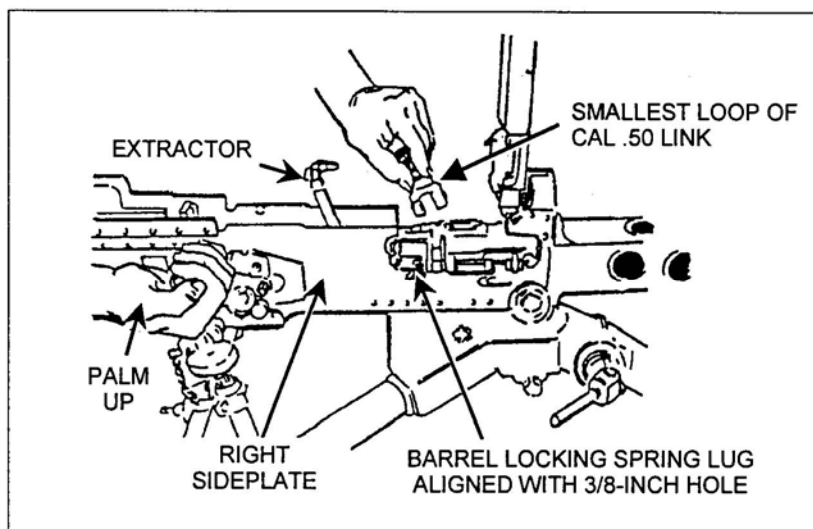


Figure 2. Alignment of the lug.

- b. Remove the backplate assembly.

**Performance Steps****WARNING**

Do not remove the backplate unless the bolt is in the forward position. When removing the backplate, stand to one side of the weapon to avoid possible injury from the driving spring rod.

- (1) Ensure that the bolt is forward and the bolt latch release is unlocked (in the single shot mode) (Figure 3).

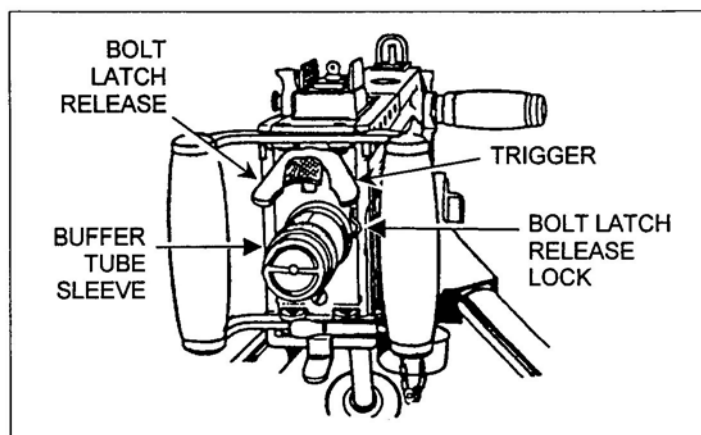


Figure 3. Releasing the bolt latch.

- (2) Pull the backplate latch lock straight back while lifting up on the backplate latch (Figure 4).

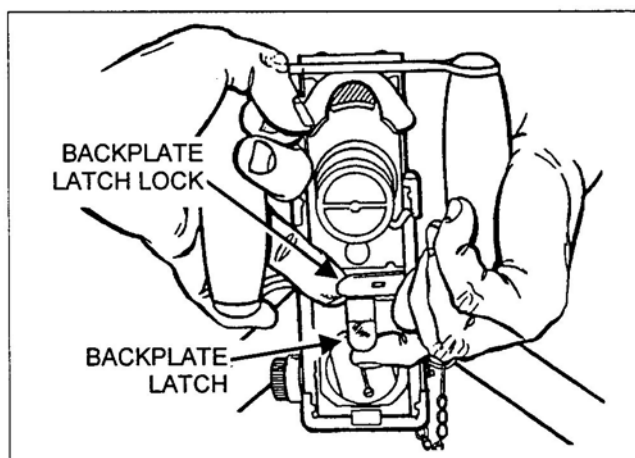


Figure 4. Removal of the backplate.

- (3) Remove the backplate assembly by lifting straight up.
- c. Remove the driving spring rod assembly (Figure 5).

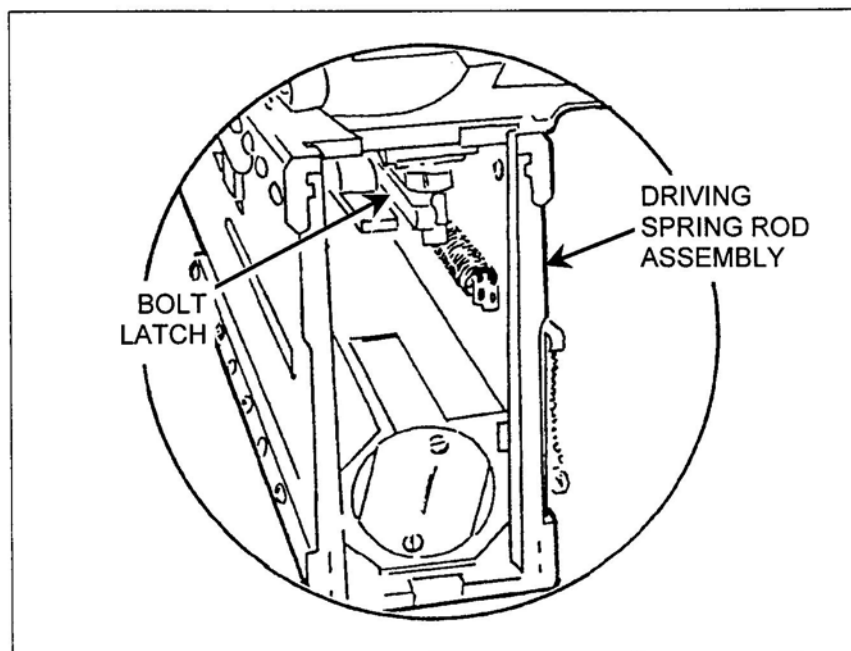
**Performance Steps**

Figure 5. Removal of the driving spring rod assembly.

- (1) Push the rear of the driving rod assembly forward and to the left to free it from the side of the receiver.

**WARNING**

Never try to charge the machine gun while the backplate is off and the driving spring rod assembly is in place. If the backplate is off and the driving spring assembly is compressed, the retaining pin on the driving spring can slip from its seat in the side plate. This could cause serious injury to anyone behind the machine gun.

- (2) Pull the driving spring rod assembly to the rear and out of the receiver.
- d. Remove the bolt assembly.
- (1) Retract the bolt assembly far enough to the rear to align the bolt stud with the bolt stud hole in the right side plate of the receiver (Figure 6).

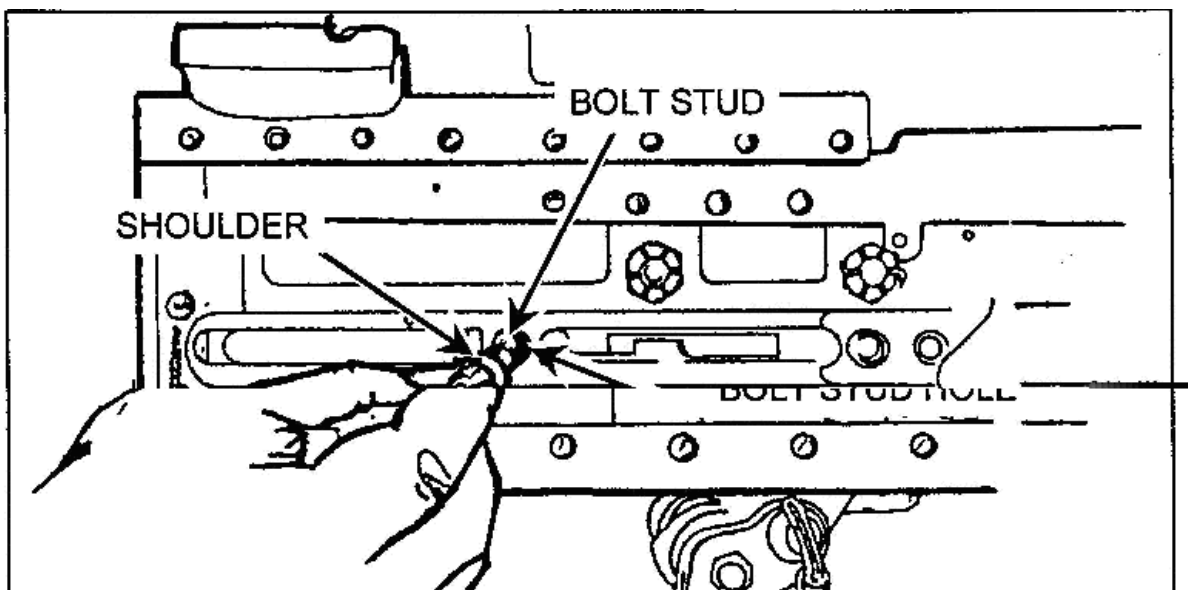
**Performance Steps**

Figure 6. Removal of the bolt stud.

- (2) If you accidentally move the bolt all the way to the rear, the bolt latch will engage in the bolt latch notches in the top of the bolt. If this occurs, raise the bolt latch and push the bolt forward to align the bolt stud with the clearance hole (Figure 7).

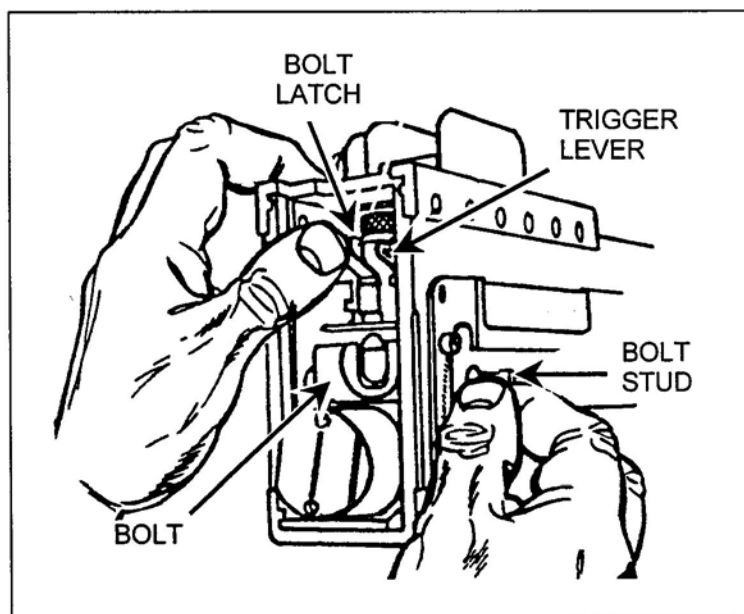


Figure 7. Unlatching the bolt.

- (3) Remove the bolt stud.  
(4) Remove the bolt assembly by pulling it from the rear of the receiver (Figure 8).

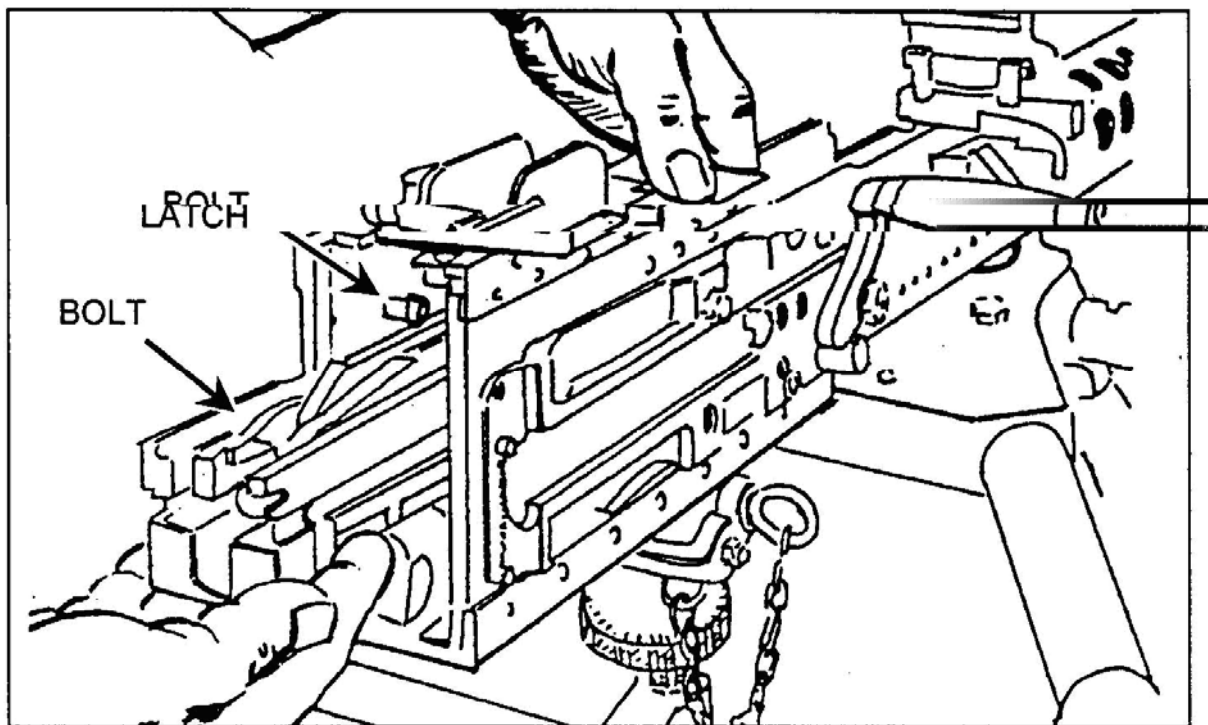
**Performance Steps**

Figure 8. Removal of the bolt from the receiver.

- (5) Disassemble the bolt.
  - (a) Rotate the cartridge extractor upward and remove it from the left side of the bolt (Figure 9).

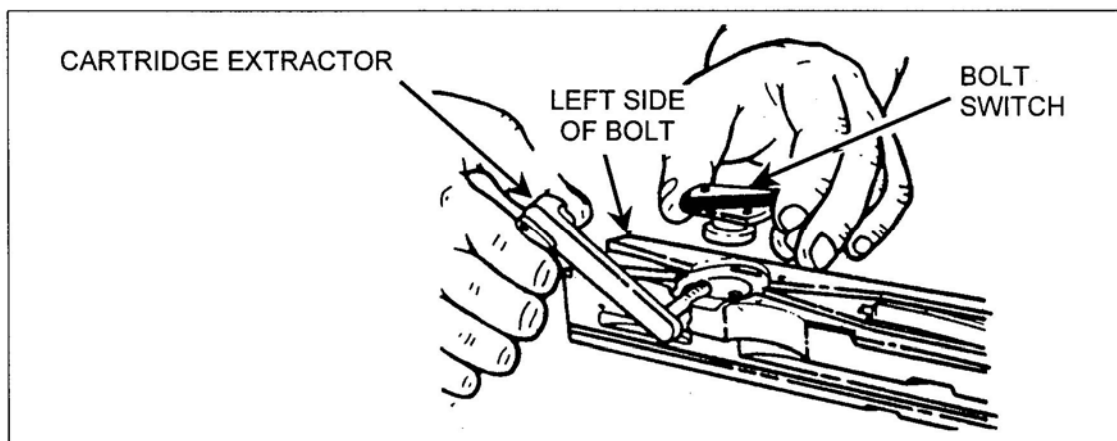


Figure 9. Removal of the cartridge extractor and bolt.

- (b) Remove the bolt switch by lifting it straight up.
    - (c) Place the cocking lever in its rearmost position. Press down on the sear with a swab holder and release the firing pin spring (Figure 10).



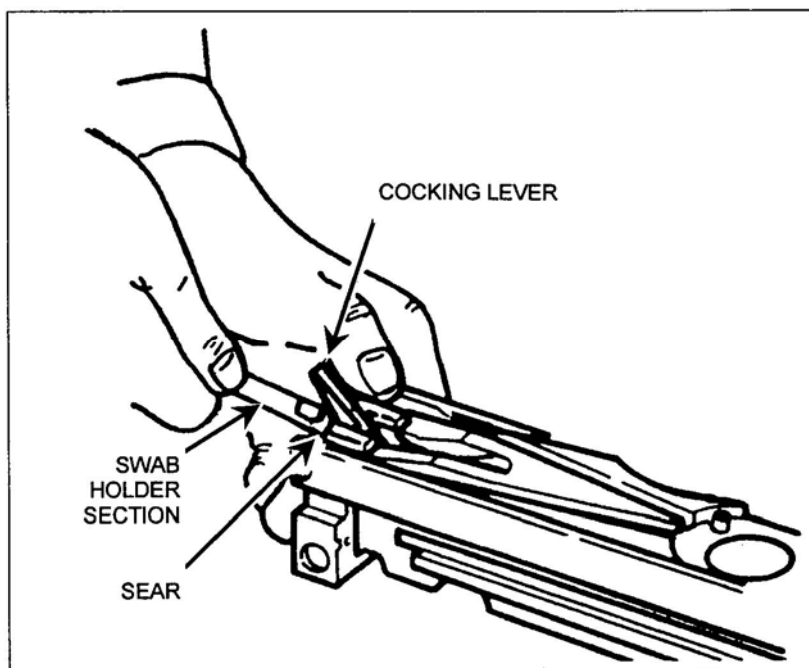
**Performance Steps**

Figure 10. Releasing the firing pin spring.

- (d) Insert a swab holder section in the hole at the rear of the bolt and push out the cocking lever pin and the cocking lever (Figure 11).

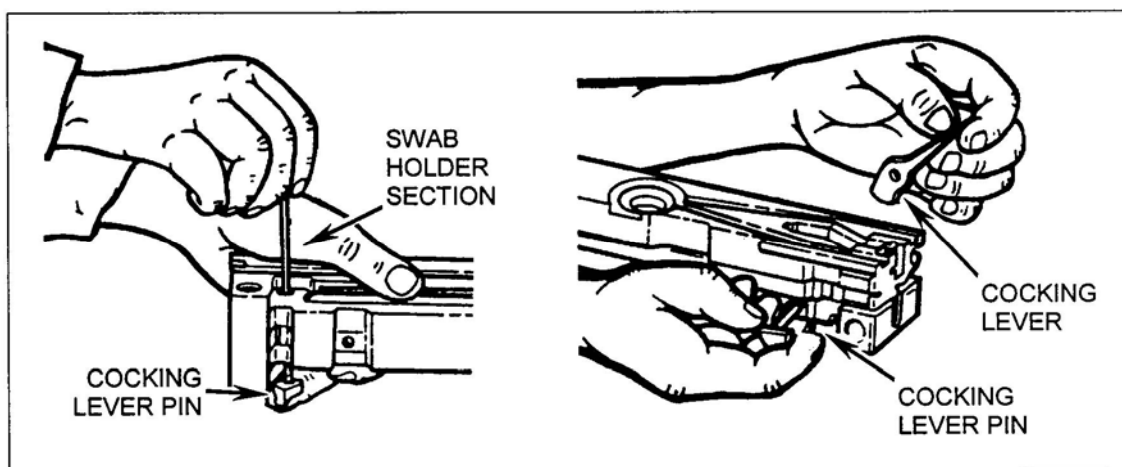


Figure 11. Removal of the cocking lever pin and cocking lever.

- (e) Use the thin end of the cocking lever to rotate the accelerator stop lock to the center of the bolt, then pry up the accelerator stop lock and remove it (Figure 12).

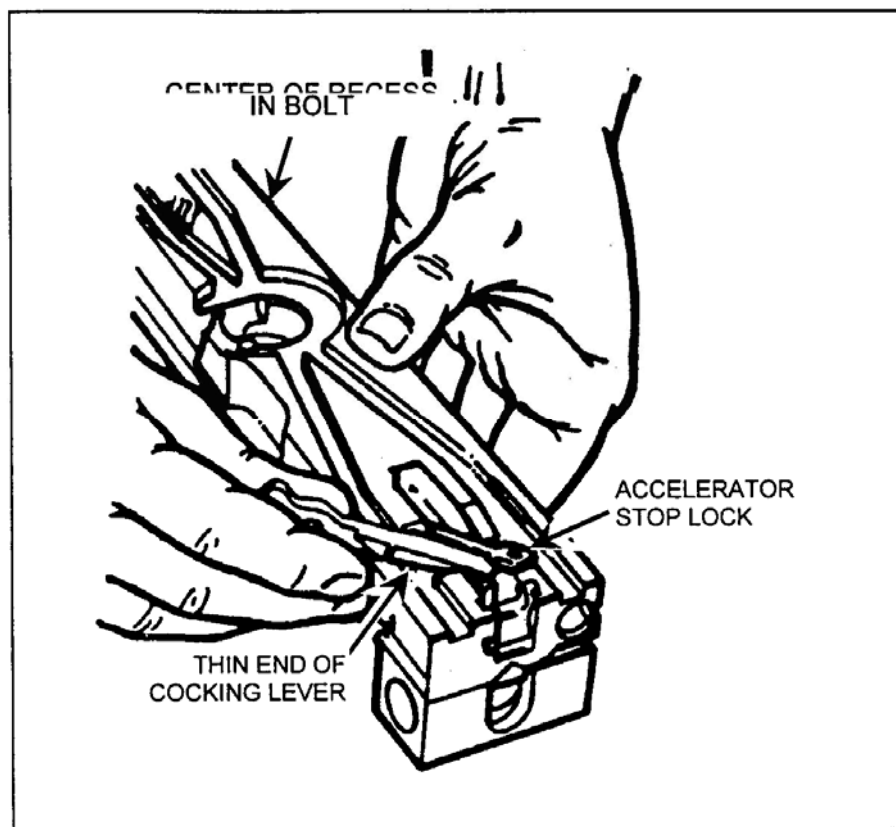
**Performance Steps**

Figure 12. Removal of the accelerator stop lock.

- ( f ) Using the thin end of the cocking lever, press the accelerator stop from the bolt, turn the bolt over, and pry the accelerator stop from bottom of bolt (Figure 13).

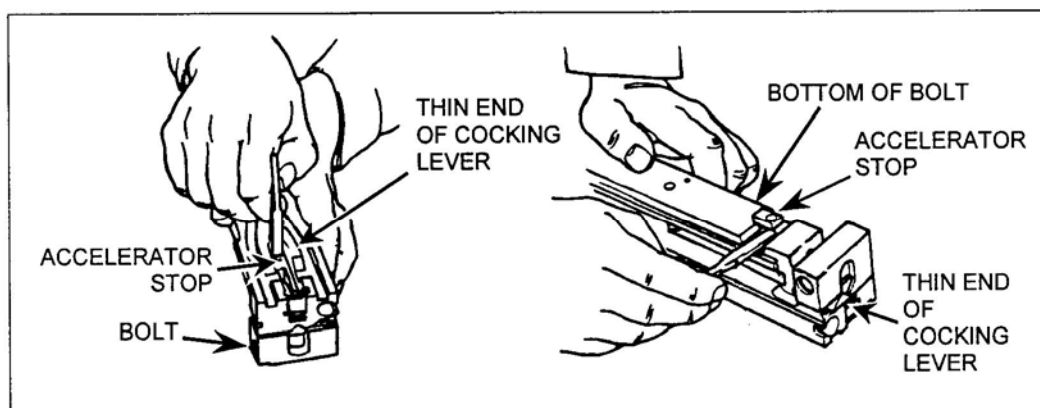


Figure 13. Removal of the accelerator stop.

- ( g ) Depress the sear and remove the sear slide, sear, and sear spring (Figure 14).

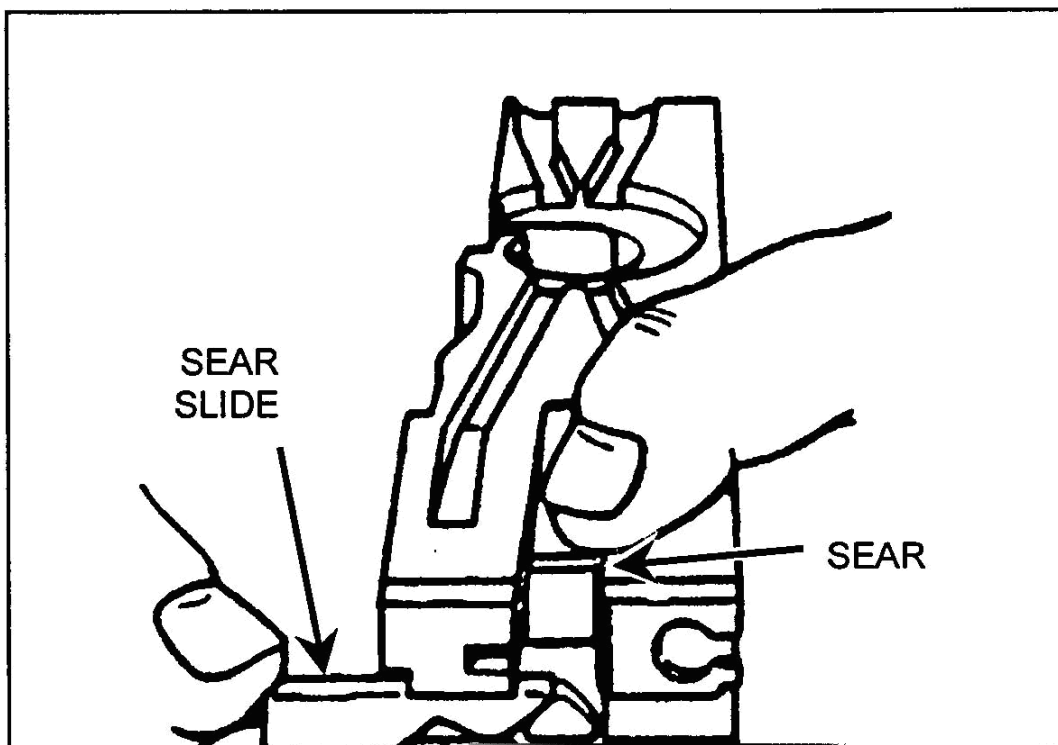
**Performance Steps**

Figure 14. Removal of the sear slide, sear, and sear spring.

- (h) Tip the front end of the bolt upward and remove the firing pin extension assembly (Figure 15).

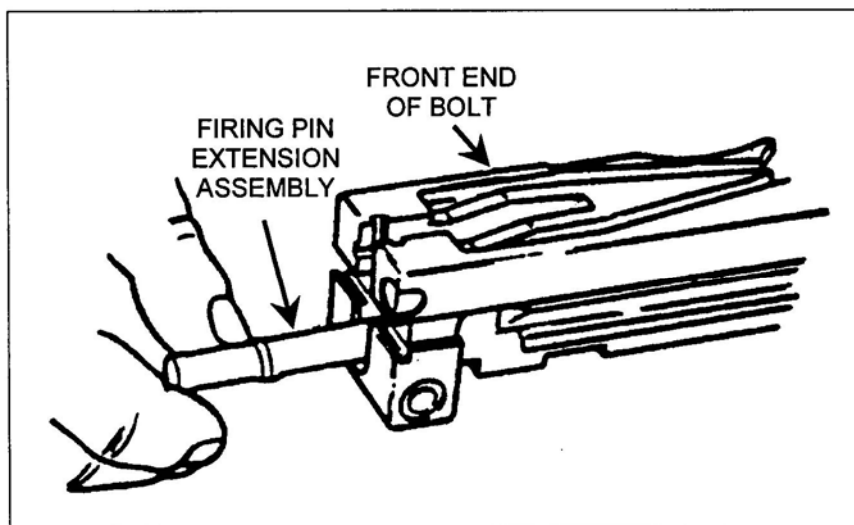


Figure 15. Removal of the firing pin extension assembly.

- (i) Remove the firing pin from the firing pin extension assembly.  
e. Remove the barrel buffer and barrel extension assemblies (Figure 16).

## Performance Steps

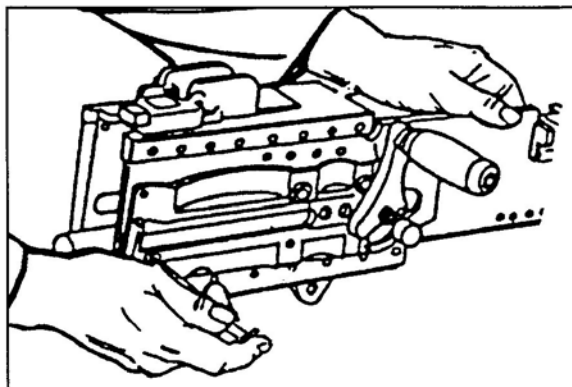


Figure 16. Removal of the barrel buffer group and barrel extension group.

- (1) Insert a pointed instrument (you can use the pointed end of the M4 cleaning rod) in the hole at the lower rear corner of the right side plate. Depress the buffer body lock and, at the same time, place one hand inside the receiver and push the barrel extension and buffer assemblies to the rear until the buffer accelerator is near the rear of the receiver body.

### WARNING

Maintain thumb pressure on the buffer accelerator while removing the barrel buffer and barrel extension assemblies.

- (2) Maintain pressure on the buffer accelerator with your thumb and remove the barrel buffer and barrel extension assemblies from the receiver. Separate them by pushing forward on the accelerator tips (Figure 17).

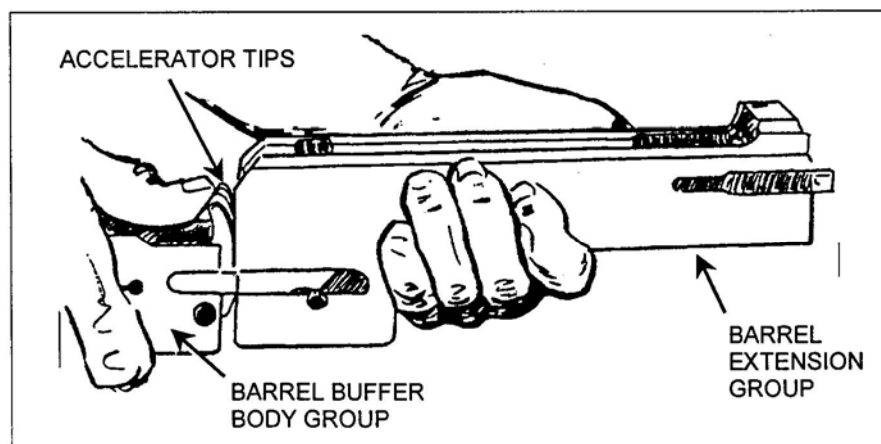


Figure 17. Separation of the barrel buffer and barrel extension assemblies.

- (3) Disassemble the barrel buffer assembly.
  - (a) Remove the buffer assembly by pushing it out the rear of the body of the barrel buffer (Figure 18).

## Performance Steps

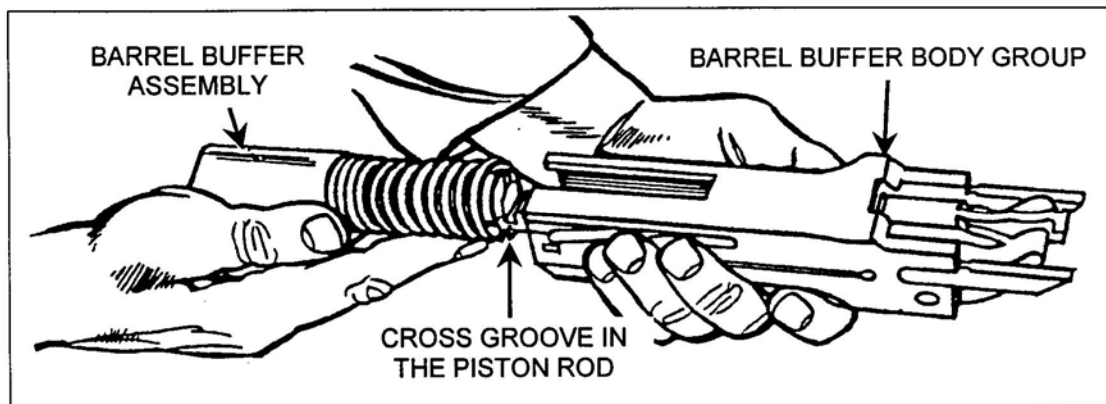


Figure 18. Removal of the barrel buffer assembly.

- (b) Using a swab holder, drive the accelerator pin assembly from the barrel buffer body group.
- (c) Remove the buffer accelerator.
- (4) Disassemble barrel extension assembly.
  - (a) Using the pointed end of the M4 cleaning rod, remove breech lock pin assembly (Figure 19).

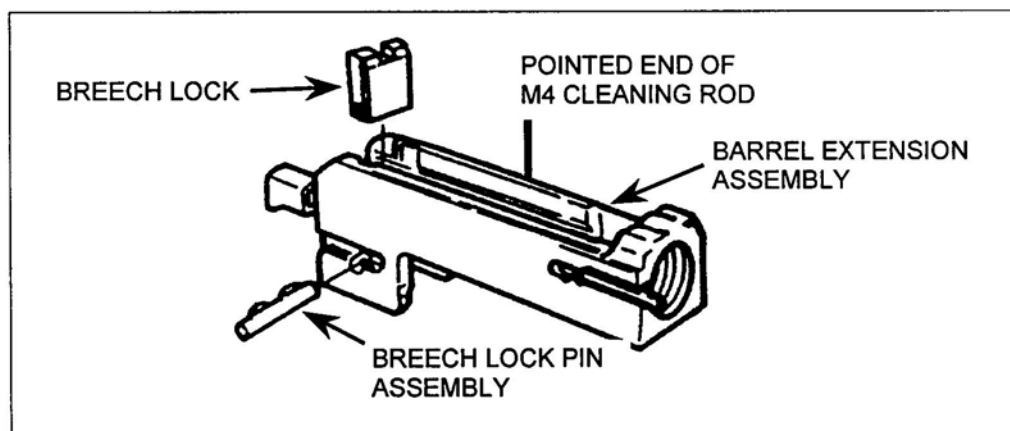


Figure 19. Removal of the breech lock pin assembly and breech lock.

- (b) Remove breech lock.
- f. Disassemble receiver assembly.
  - (1) Remove the front cartridge stop and rear cartridge stop assembly (Figure 20).

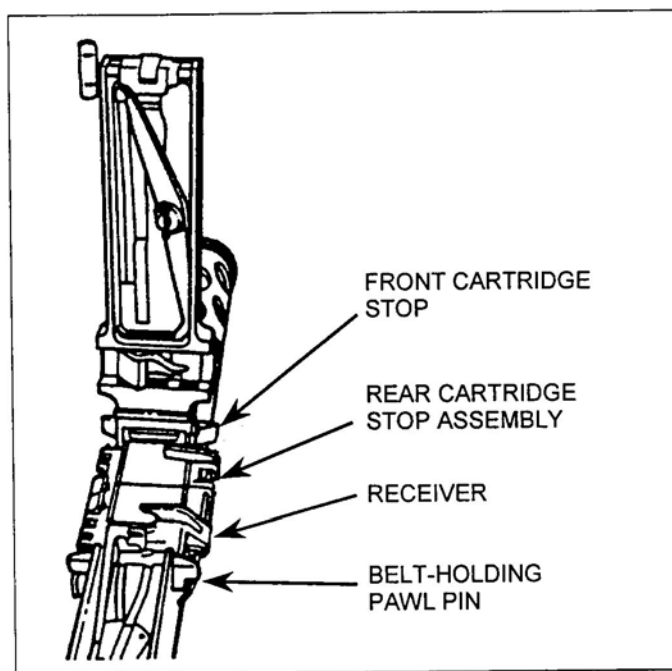
**Performance Steps**

Figure 20. Removal of the cartridge stop assemblies.

- (2) Press down on belt holding pawl assembly to prevent loss of springs, and remove the belt holding pawl pin. Remove belt holding pawl assembly and springs (Figure 21).

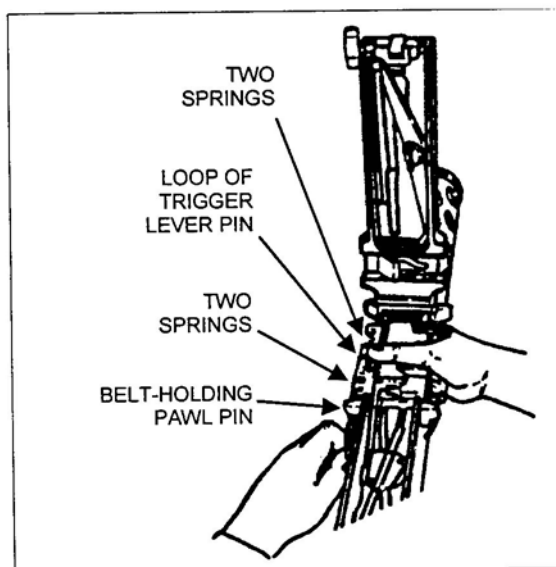


Figure 21. Removal of the belt holding pawl pin, assembly, and springs.

- (3) Raise the loop of the trigger lever pin and rotate it into a vertical position. Reach inside the receiver, grasp the trigger lever, and remove the trigger pin assembly and trigger lever (Figure 22).

## Performance Steps

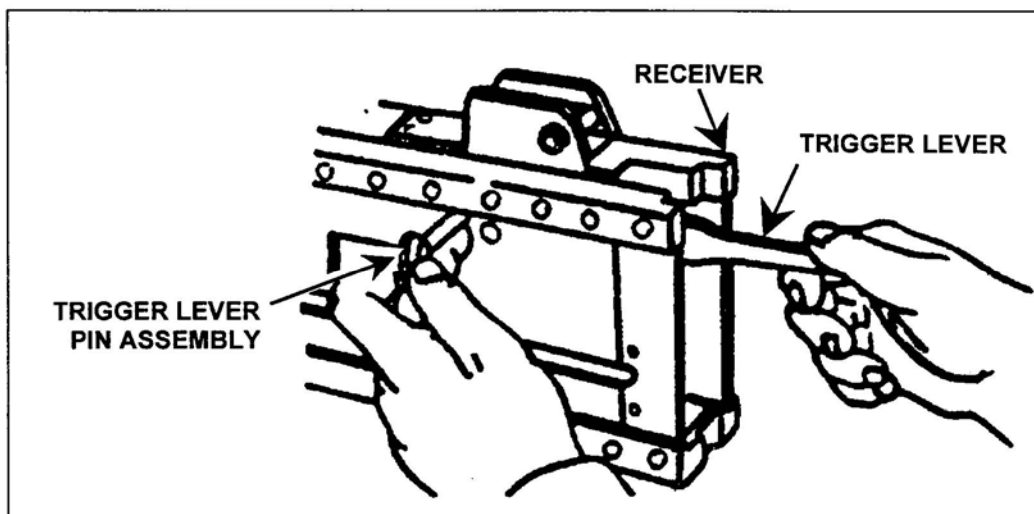


Figure 22. Removal of the trigger lever pin assembly and trigger lever.

### 3. Clean the .50 caliber machine gun and components.

- a. Before firing (when the situation permits), take the following steps to ensure efficient functioning of the machine gun:

#### a. Barrel assembly.

- (1) Clean the bore. Screw the bore brush into the cleaning rod, dip the bore brush in RBC, and push the cleaning rod through the chamber end of barrel. Unscrew the bore brush from the cleaning rod. Repeat the process until clean.
- (2) Clean the chamber. Screw the chamber brush into the cleaning rod, dip the chamber brush in RBC, and clean the chamber using a clockwise twisting motion.
- (3) Insert a cleaning swab in the cleaning rod and swab out the bore from the chamber end and back. Repeat until a swab comes out clean.
- (4) Wipe outside surfaces of barrel with carbon removing compound.
- (5) Remove all traces of RBC before lubricating.

NOTE: Do not submerge the backplate assembly in any fluid.

- b. Backplate assembly. Use only clean wiping rags to remove foreign matter from backplate.

- c. Bolt assembly. Clean all parts of bolt assembly with a cleaning swab saturated with carbon removing compound. Clean the face of the bolt with a cleaning swab soaked in RBC.

- d. Clean barrel buffer assembly, barrel extension assembly, and receiver assembly with a cleaning swab saturated with carbon removing compound. Wipe all parts dry with clean wiping rags.

#### e. Clean components.

- (1) T&E mechanism. Remove foreign matter with a clean dry wiping rag. Use a small arms cleaning brush to clean numbers on the scale.
- (2) Clean M3 tripod, MK64 gun cradle mount, and pintle with a cleaning swab saturated with carbon removing compound. Wipe all parts dry with clean wiping rags.

- f. Ammunition. Remove foreign matter with a clean dry wiping rag.

### 4. Inspect for serviceability.

#### a. Barrel assembly.

- (1) Check barrel locking notches for wear.
- (2) Check the bore for bulges, missing bands, and large pits.

#### b. Backplate assembly.

- (1) Check guides for burrs and bends.
- (2) Check backplate latch and backplate lock for proper functioning.

**Performance Steps**

- (3) Make sure locking pins are in place.
- (4) Check trigger and bolt latch release for proper functioning.
- (5) Make sure handle grips do not move freely and are not cracked.
- c. Driving rod assembly.
  - (1) Check for flat spots on springs.
  - (2) Make sure springs operate freely and rod and pin are not bent.
- d. Bolt assembly.
  - (1) Check movement of cartridge extractor in bolt: it should raise and lower without binding. Check movement of cartridge ejector.
  - (2) Check bolt switch, cocking lever pin, cocking lever, accelerator stop lock, accelerator stop, and sear slide for cracks, bends, and burrs.
  - (3) Inspect sear for cracks and burrs. Inspect sear notch for wear, chips, and burrs. Inspect sear spring for breaks and lack of tension.
  - (4) Inspect firing pin for cracks and chipped or sharp tip. Tip should be smooth and well rounded.
  - (5) Check firing pin extension for cracks, burrs, and free movement in bolt.
  - (6) Make sure bolt is free of burrs and cracks and firing pin hole is not visually out of round.
- e. Barrel buffer assembly.
  - (1) Inspect buffer body lock for tension, staking, and retention in barrel buffer body.
  - (2) Inspect buffer accelerator for broken claws or chipped tips.
  - (3) Inspect accelerator pin assembly for broken or missing spring.
  - (4) Inspect buffer spring for cracks or breaks.
  - (5) Inspect breech lock depressors. They must have slight vertical (up and down) movement but should have no lateral (side to side) movement.
- f. Barrel extension assembly.
  - (1) Make sure barrel extension assembly is not bent and that the bolt guideways are smooth and free of burrs.
  - (2) Inspect threads of barrel extension assembly for damage.
  - (3) Make sure barrel locking spring is staked and fully seated in its groove. Also, make sure the locking end of the spring has good tension and the lug is not damaged.
  - (4) Check breechblock for smooth movement in guideways of barrel extension assembly.
- g. Receiver and cover assembly.
  - (1) Inspect belt holding pawl brackets for looseness, bends, and cracks.
  - (2) Inspect side plates for bends that would affect movement of any internal parts.
  - (3) Check for cracks and burrs at backplate grooves.
  - (4) Check operation of rear sight. Make sure windage and elevation screws function properly, leaf assembly has good spring tension, and sight assembly is secured tightly to receiver.
  - (5) Make sure bolt stop is present and in good condition.
  - (6) Make sure trigger lever moves freely.
  - (7) Make sure trigger lever pin locks in place.
  - (8) Make sure cotter pin is in place on extractor switch.
  - (9) Check retracting slide assembly for visible damage. Check retracting slide handles for smooth movement. Make sure cotter pins are present and in good condition, and safety wire is in place and properly laced.
- h. Inspect components.
  - (1) T&E mechanism.
    - (a) Inspect hand wheels and threads for burrs and rust. Check hand wheels for smooth operation.
    - (b) Make sure traversing slide lock lever has spring action. Make sure elevating mechanism sleeve fits on traversing bar and clamps firmly.
    - (c) Check traversing and elevating scales for legibility.
    - (d) Inspect quick release pin and chain for burrs and rust. Check quick release pin for presence of spring loaded balls.
  - (2) M3 tripod.



**Performance Steps**

- (a) Check for completeness of tripod. Make sure all nuts and bolts are tightly secured.
- (b) Check for visible cracks on legs and tripod head.
- (c) Check for missing, broken, or inoperative sleeve lock latch.
- (d) Check pintle lock assembly. Check surfaces of pintle, bolt, and nut for burrs and rust. Make sure cotter pin is present and in good condition.
- (e) Check locking action of front leg clamping assembly.
- (f) Check that rear legs lock in the open position. Make sure sleeve latch notch and right leg slide notch engage completely. Make sure latch spring has good tension.
- (g) Check telescoping, indexing, and locking action of rear legs and front leg clamping assembly.
- (3) MK64 gun cradle mount.
  - (a) Check for missing or damaged parts.
  - (b) Check for rust, cracks, and burrs.
  - (c) Check pintle lock assembly. Check surfaces of pintle, bolt, and nut for burrs and rust. Make sure cotter pin is present and in good condition.
- i. Inspect ammunition. Check for damage or corroded rounds.
- 5. Lubricate the .50 caliber machine gun.
  - a. Remove all traces of RBC or carbon removing compound.

**CAUTION**

Do not mix lubricants on the same weapon. The weapon must be thoroughly cleaned with dry cleaning solvent during change from one lubricant to another.

- b. Lubricate exterior of backplate with a light coat of oil. Do not lubricate interior of backplate.
- c. Lubricate all other parts with a light coat of LSA or CLP (at temperatures above 0 degrees Fahrenheit) or LAW (at temperatures below 0 degrees Fahrenheit).
- 6. Assemble the .50 caliber machine gun.
  - a. Assemble the trigger lever (Figure 23).

## Performance Steps

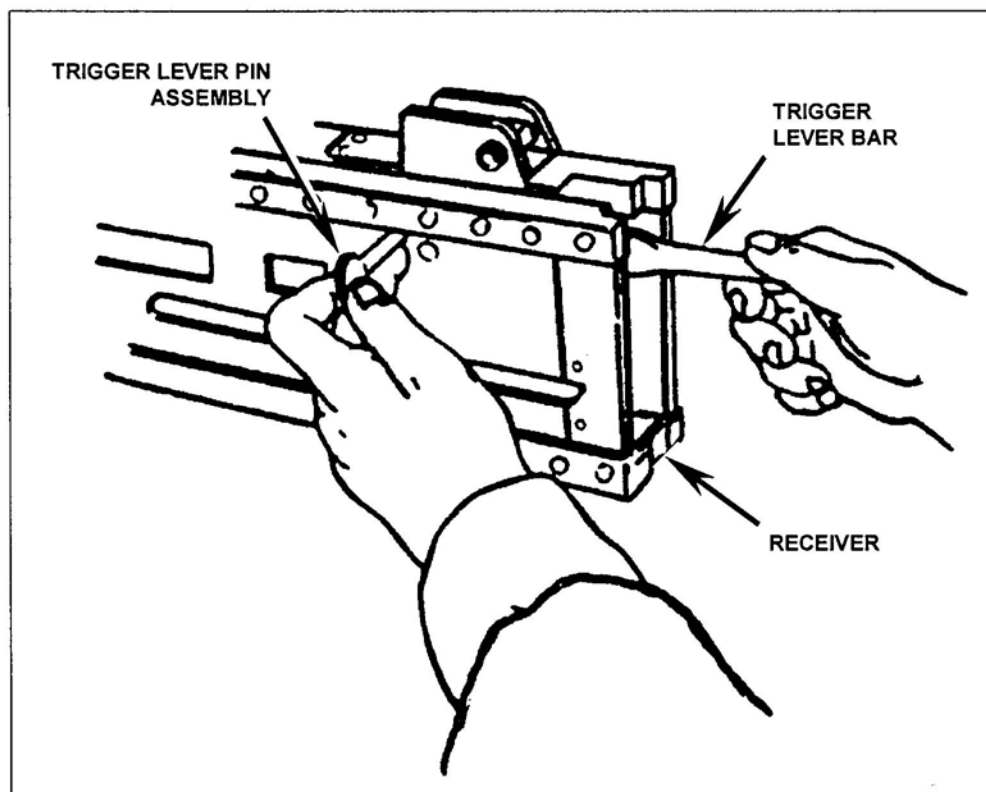


Figure 23. Assembly of the trigger lever.

- (1) Place the trigger lever bar in the receiver directly under the timing nut so that the hole in the trigger lever bar is aligned with the mounting hole in the receiver.
  - (2) Insert trigger lever pin assembly (loop end vertical) in the assembly hole on left side of receiver. Match key on trigger lever pin with keyway in side plate of receiver and install the pin completely.
  - (3) Rotate trigger pin lever assembly 90 degrees and lock in place. Fold the loop end down.
- b. Assemble receiver group.
- (1) Determine the direction of feed. Figure 24 shows left-hand feed. Place the right-hand rear cartridge stop assembly and front cartridge stop on the belt holding pawl bracket.

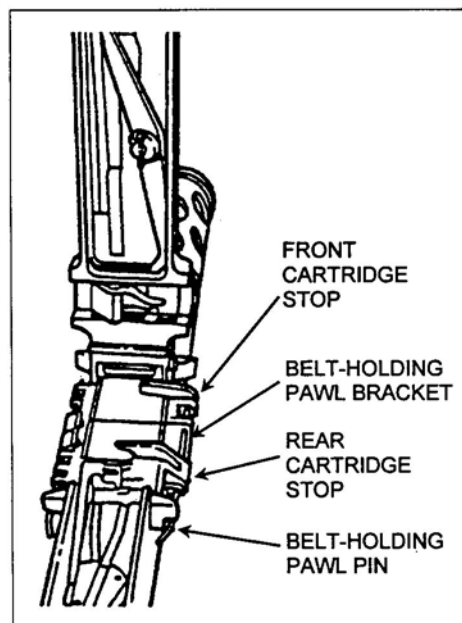
**Performance Steps**

Figure 24. Installation of the rear cartridge stop assembly and front cartridge stop.

- (2) Install belt holding pawl pin with hooked end to rear.
- (3) Seat belt holding pawl springs in place on the belt holding pawl bracket.
- (4) Place belt holding pawl assembly on the springs. Compress springs and insert belt holding pawl pin (Figure 25).

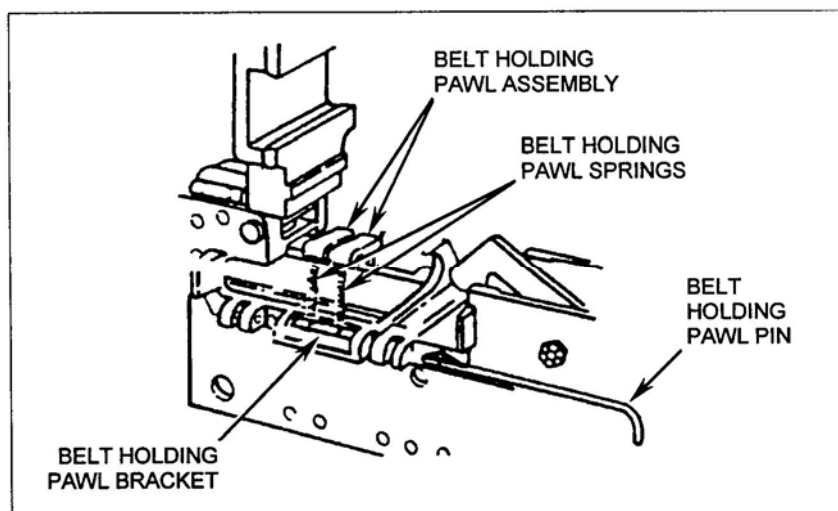


Figure 25. Installation of the belt holding pawl assembly.

c. Assemble barrel extension (Figure 26).

## Performance Steps

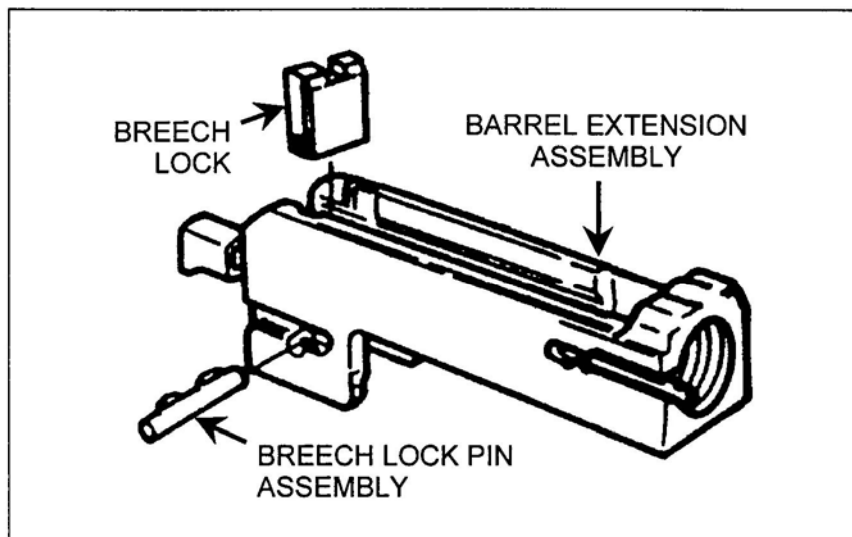


Figure 26. Assembly of the barrel extension assembly.

- (1) Install breechblock lock with beveled edge up and to the front of barrel extension assembly.
  - (2) Install breech lock pin assembly in barrel extension. Make sure both ends of breech lock pin assembly are flush with sides of barrel extension assembly.
- d. Assemble barrel buffer assembly.
- (1) Place buffer accelerator (tips up) into barrel buffer body, align mounting holes, and install buffer pin assembly. Ensure both ends of barrel buffer pin assembly are flush with sides of barrel buffer body (Figure 27).

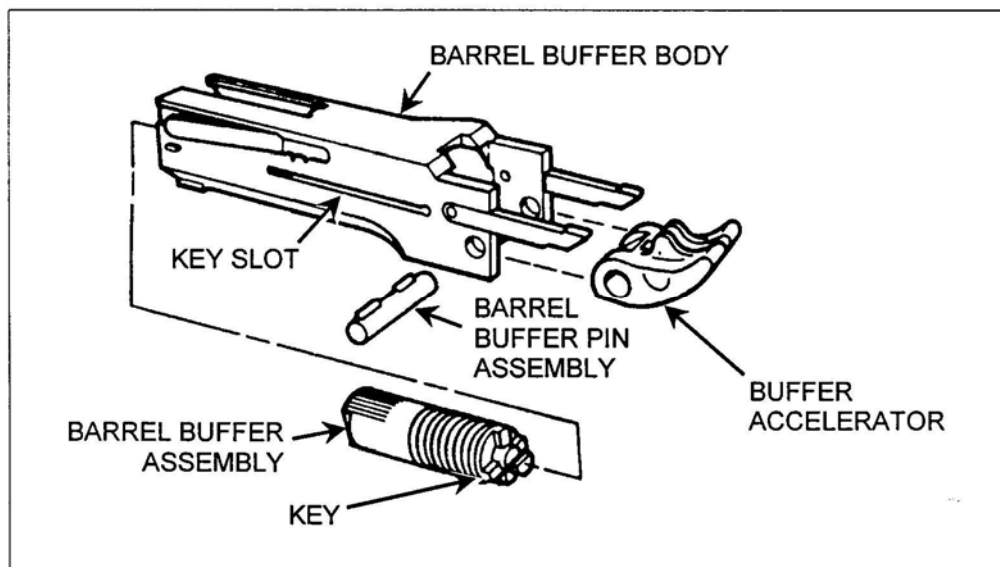


Figure 27. Assembly of the barrel buffer assembly.

- (2) Align key on barrel buffer assembly with key slot in barrel buffer body and slide barrel buffer assembly into barrel buffer body.

**Performance Steps**

- (3) Hold the barrel buffer assembly with the buffer accelerator up and engage the notch on the shank of the barrel extension assembly with the cross groove in the piston rod of the barrel assembly (Figure 28).

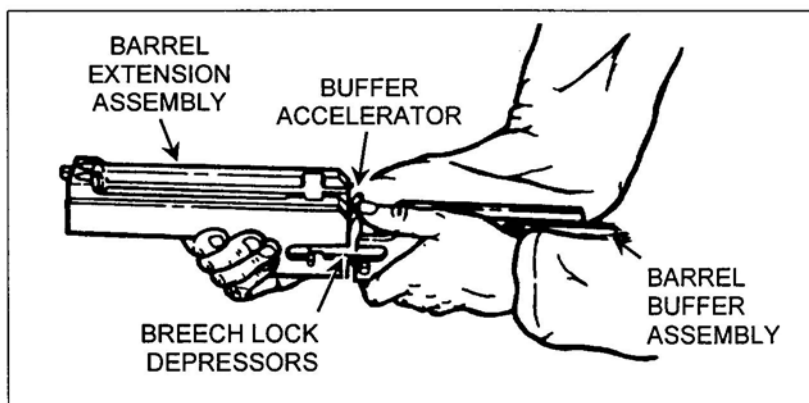


Figure 28. Attachment of the barrel buffer and barrel extension assemblies.

- (4) Align breech lock depressors in grooves of barrel extension assembly and push barrel buffer assembly forward.
- (5) Install barrel buffer assembly and barrel extension assembly in receiver (Figure 29).

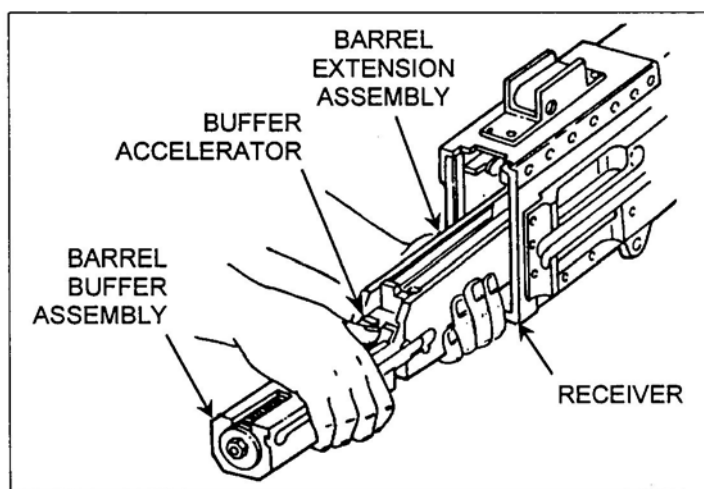


Figure 29. Installation of the barrel buffer and barrel extension assemblies.

e. Assemble bolt assembly.

- (1) Attach firing pin to firing pin extension assembly (Figure 30).

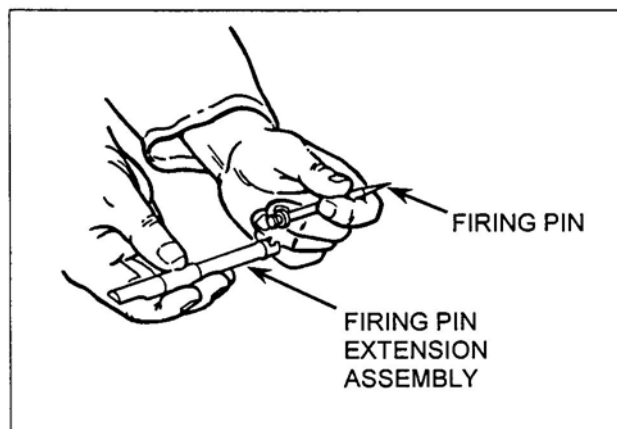
**Performance Steps**

Figure 30. Attachment of the firing pin to the firing pin extension assembly.

- (2) Insert firing pin extension assembly into bolt with notch of firing pin extension assembly down (Figure 31).

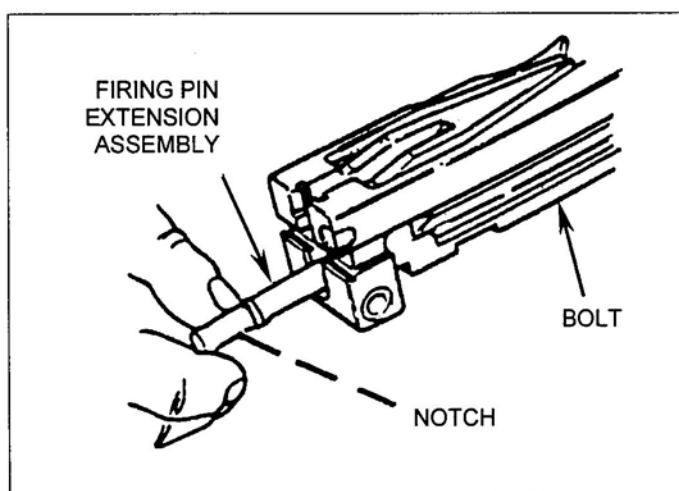


Figure 31. Installation of the firing pin extension assembly.

- (3) Slide firing pin extension assembly forward so that tip of firing pin protrudes from face of bolt.
- (4) Place sear spring in recess on bolt. Slide sear down into vertical grooves at rear of bolt with wedge-shaped lug pointed outward and upward (Figure 32).

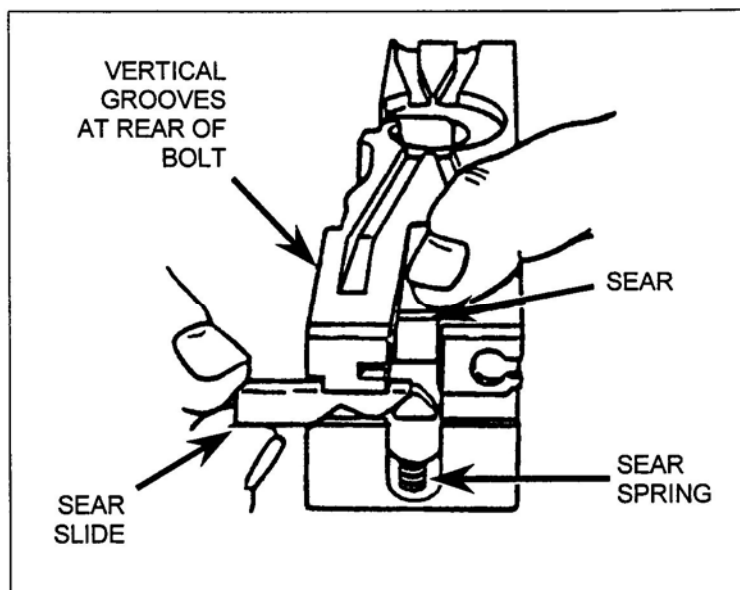
**Performance Steps**

Figure 32. Installation of the sear side.

- (5) Compress sear spring by pressing down on the sear. Install sear slide from left side of bolt in grooves of bolt with "V" notch down.

NOTE: Make sure the pin end of the accelerator is installed behind the firing pin spring, not through a coil.

- (6) Insert pin end of accelerator stop through bottom of bolt (Figure 33).

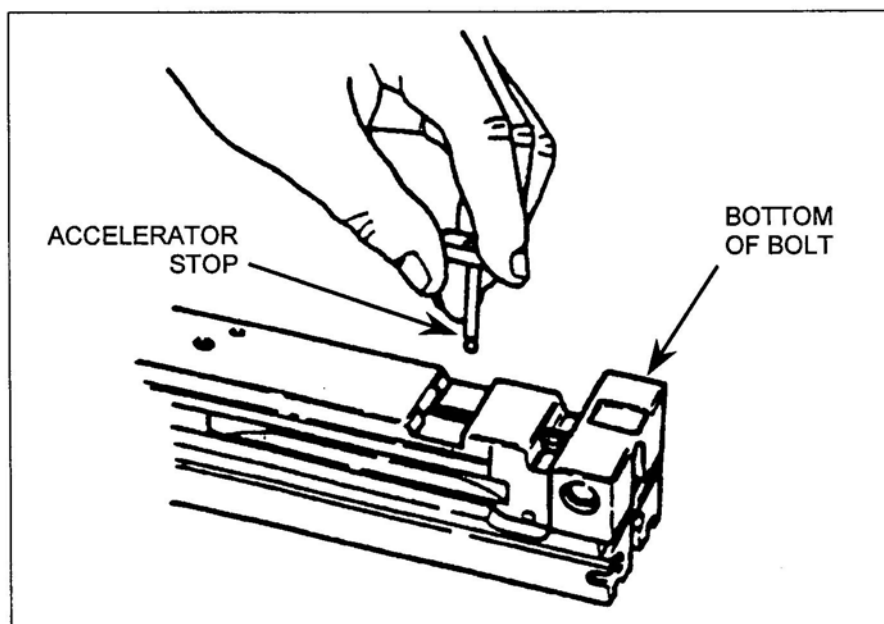


Figure 33. Attachment of the accelerator stop.

NOTE: Base end of accelerator stop should be installed with long end forward so beveled edges match.

**Performance Steps**

- (7) Turn bolt over. Place forked end of accelerator stop lock on notched end of accelerator stop.
- (8) Using the wedge-shaped end of the cocking lever, press down on the flat end of the accelerator stop lock, and move the cocking lever into the groove on the left side of the bolt (Figure 34).

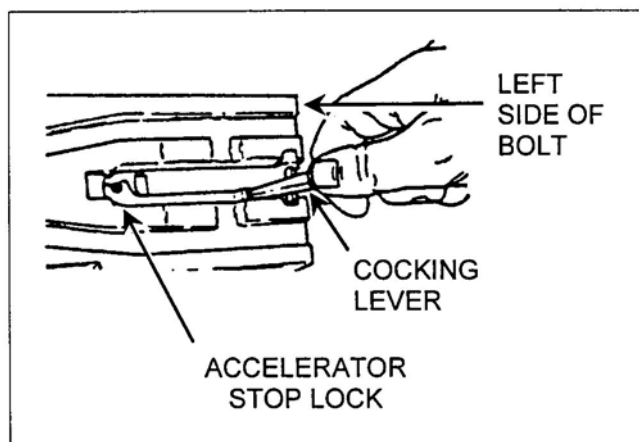


Figure 34. Attachment of the accelerator stop lock.

- (9) Insert cocking lever, with rounded nose on lower end of lever to rear, into slot in top of bolt (Figure 35).

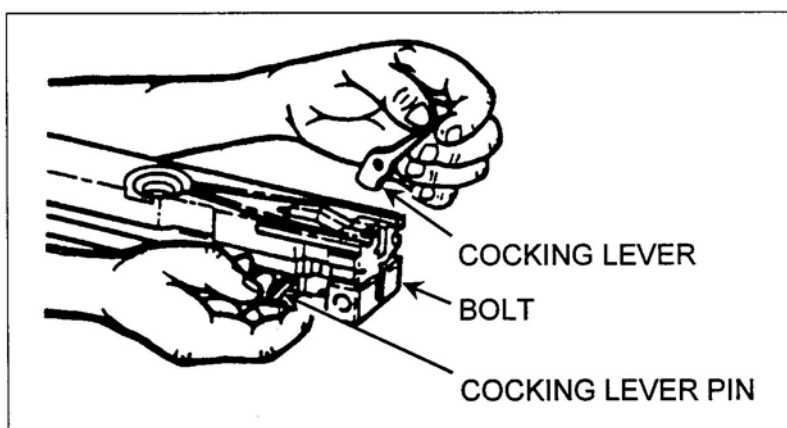


Figure 35. Attachment of the cocking lever.

- (10) Align the hole in the cocking lever with the holes in the bolt. Insert the cocking lever pin from the left side.
- (11) Push the cocking lever forward to charge the firing pin. Return the cocking lever to the rearward position.

**WARNING**

Do not try to release the firing pin with the cocking lever forward. The cocking lever could spring back forcibly and cause serious injury.

- (12) Test firing pin release. Trip the firing pin by depressing the top of the sear with a section of a swab-holder. If doing so makes a sharp metallic sound, then the firing pin spring is in good condition (Figure 36).



## Performance Steps

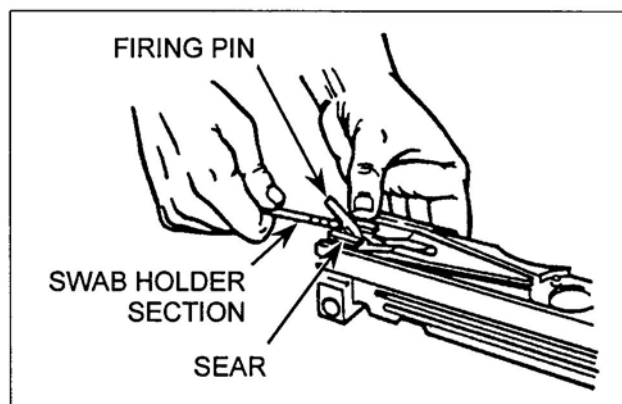


Figure 36. Testing the firing pin release.

- (13) Place cocking lever in forward position. Determine the direction of feed before installing the bolt switch. Figure shows left-hand feed.
- (14) Place bolt switch in position so that the feed groove is continuous for feed direction indicated (Figure 37).

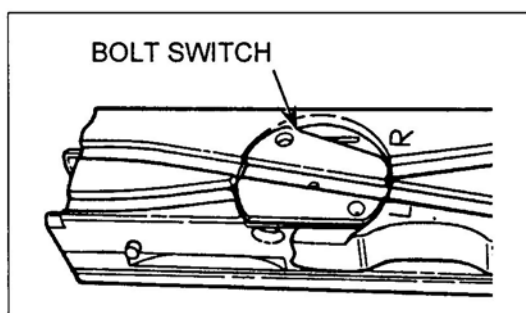


Figure 37. Setting the bolt switch.

- (15) Hold cartridge extractor in vertical position and insert shank end of cartridge extractor into left side of bolt. Make sure cartridge extractor fits into bolt as far as possible.
- (16) Rotate cartridge extractor downward to full horizontal position. Check that flange on bottom of cartridge extractor has engaged shoulder on bolt.
- (17) Ensure cocking lever is forward.
- (18) Push bolt assembly forward into receiver until bolt latch engages notches in top of bolt assembly (Figure 38).

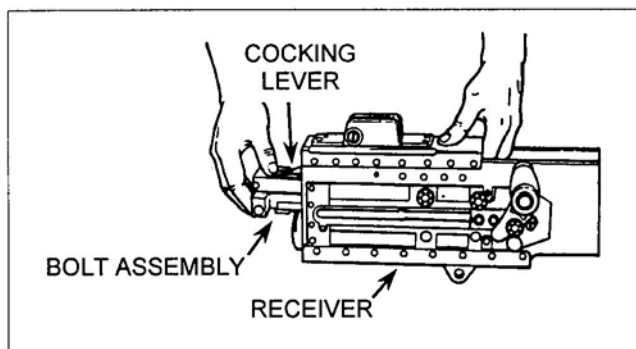
**Performance Steps**

Figure 38. Installation of the bolt assembly.

- (19) If you cannot install the bolt this way, remove the barrel extension and buffer assembly from the receiver. Install the bolt assembly into the barrel extension and buffer assembly, then install them in the receiver (Figure 39).

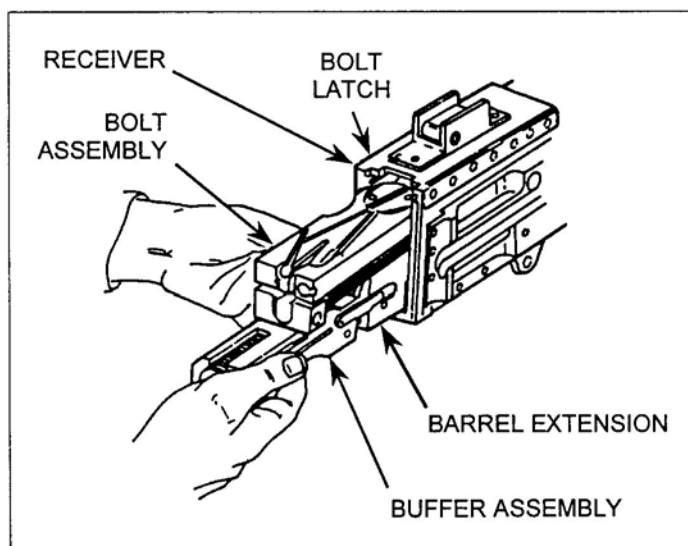


Figure 39. Installation of the bolt assembly within the barrel extension and buffer assembly.

- (20) Raise bolt latch and push bolt assembly into the receiver.  
(21) Align holes in bolt assembly with stud assembly hole in receiver and install bolt stud in hole in bolt assembly. Place bolt in forward position (Figure 40).

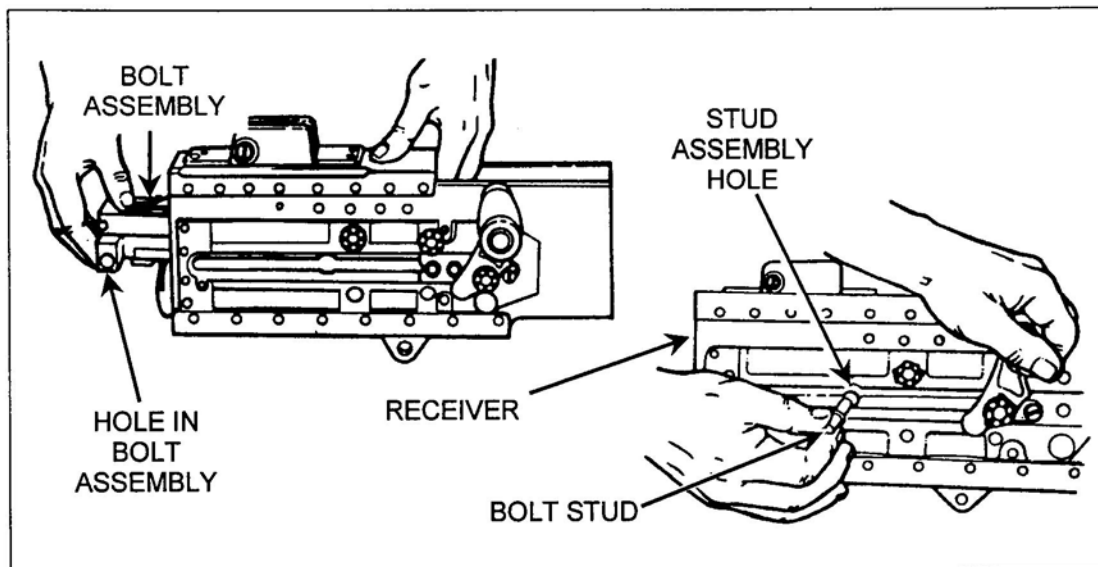
**Performance Steps**

Figure 40. Installation of the bolt assembly.

- f. Assemble driving spring rod assembly (Figure 41). Install the driving spring rod assembly in the upper right corner of the bolt. Push forward and to the right until the driving spring rod assembly engages in the hole in the side plate of the receiver--not in the groove for the backplate.

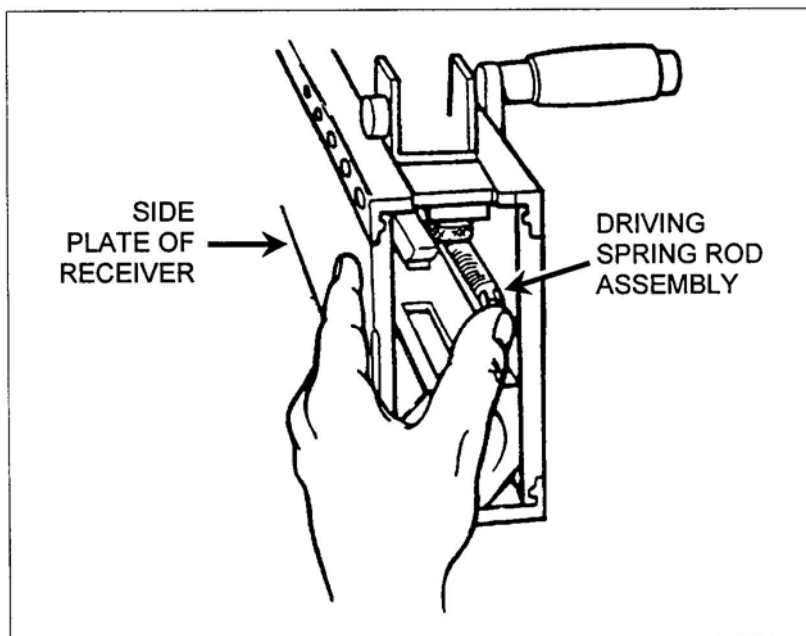


Figure 41. Installation of the driving spring rod assembly.

- g. Install backplate assembly (Figure 42).

## Performance Steps

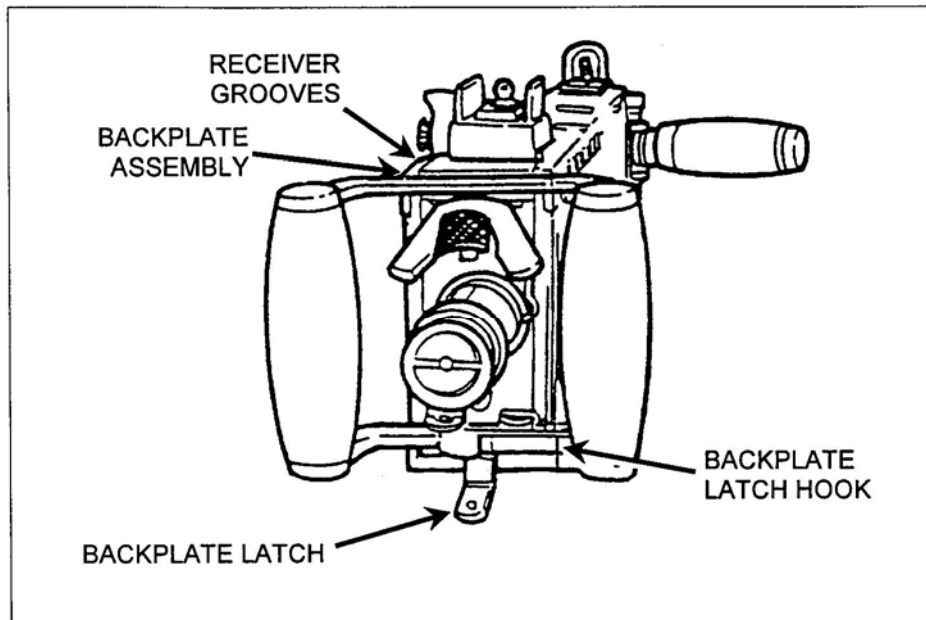


Figure 42. Installation of the backplate assembly.

- (1) Align backplate assembly with receiver grooves. Pull backplate latch lock while lifting up on backplate latch. Lower backplate assembly down until engaged in receiver.
- (2) Test proper locking by pulling up on backplate assembly.
- h. Assemble barrel assembly.
  - (1) Retract bolt far enough for barrel locking spring lug to center in barrel locking spring hole on right side of receiver.
  - (2) Place the smallest loop of a caliber .50 link between the trunnion block and the barrel extension. This holds the barrel locking spring lug aligned with the 3/8-inch hole.
  - (3) Install and screw barrel assembly completely into receiver. Unscrew barrel assembly two clicks and check headspace.
7. Perform a function check to make sure weapon is assembled correctly.
  - a. Place the weapon in the single-shot mode.
  - b. Open the cover and pull the retracting slide handle to the rear. Bolt should lock to rear in single-shot mode.
  - c. Hold the retracting slide handle to the rear; depress bolt latch release and ease the bolt forward.
  - d. Press trigger; weapon should fire.
  - e. Place the weapon in the automatic-fire mode.
  - f. Pull the retracting slide handle to the rear and hold. Bolt should not lock to rear in automatic-fire mode.
  - g. Release pressure on the retracting slide handle and ease the bolt forward.
  - h. Press trigger; weapon should fire.

**Evaluation Preparation:** Setup: At the test site, provide the soldier with equipment listed in conditions. Use performance steps in the training outline to evaluate soldier's performance of the task.

**Brief Soldier:** Tell the soldier that he must clear, disassemble, clean, inspect, lubricate, assemble, and perform a function check on the weapon.

**Performance Measures**

	<u><b>GO</b></u>	<u><b>NO GO</b></u>
1. Clear the weapon.	_____	_____
2. Disassemble the weapon without damaging any parts.	_____	_____
3. Clean the weapon, components, and ammunition.	_____	_____
4. Identify any damaged, worn, or malfunctioning parts.	_____	_____
5. Lubricate weapon using the correct lubrication technique.	_____	_____
6. Assemble weapon in correct sequence without damaging any parts.	_____	_____
7. Perform a function check.	_____	_____

**Evaluation Guidance:** If the soldier passes all steps, score him GO. If he fails any steps, score him NO-GO, then show him what he did wrong and how to do it correctly.

**References****Required****Related**

FM 23-65

TM 9-1005-213-10

## Load a Caliber .50 M2 Machine Gun

071-022-0003

**Conditions:** In a combat environment, given an assembled and cleared caliber .50 machine gun with headspace and timing correctly set, a belt of linked caliber .50 ammunition, and a requirement to load the belt of ammunition for firing in the automatic mode.

**Standards:** The caliber .50 machine gun is loaded without damage to the weapon or ammunition or injury to personnel.

### Performance Steps

1. Loading.
  - a. Ensure that the bolt is forward and the cover is closed.
  - b. Insert the double-loop end of the belt in the feedway until the first round is engaged by the belt-holding pawl.
  - c. Jerk the retracting slide handle to the rear and release it. (If the bolt latch release is up, return the retracting slide handle to the forward position and then release the bolt.) The gun is now "half-loaded."
  - d. To complete loading, jerk the retracting slide handle to the rear a second time and release it. When the bolt goes forward for the second time, the gun is loaded.
2. Firing (single shot and automatic).
  - a. Single shot. Keep the bolt latch release in the up position and release it manually for each round, then push the trigger.
  - b. Automatic. Lock the bolt latch release down with the bolt latch release lock.

**CAUTION:** Never close the cover when the bolt is to the rear. Never allow the bolt to go forward freely when the barrel is out of the gun. Ease the bolt forward with the retracting slide handle.

3. Unloading and clearing.
  - a. Cold gun. To unload and clear a cold gun--
    - (1) Unlock the bolt latch release, if necessary, and raise the cover.
    - (2) Lift the extractor from the ammunition belt.
    - (3) Lift the ammunition belt from the feedway.
    - (4) Pull the bolt to the rear.
    - (5) Ensure that the T-slot and chamber contain no rounds.
  - b. Hot gun. To unload and clear a hot gun--
    - (1) Place the gun in the single-shot mode.
    - (2) Fire the round in the chamber.
    - (3) Open the cover; remove the ammunition belt.
    - (4) Press down on the bolt latch release, allowing the bolt to go forward and chamber the round.
    - (5) Close the cover and fire the round.
4. Immediate action. Immediate action is the action taken to reduce a stoppage without investigating the cause. This action must be accomplished within 10 seconds when the barrel is hot enough to cause a cook off. Two hundred rounds fired in a 2-minute period may heat the barrel sufficiently to cause a cook off.
  - a. If a stoppage occurs, immediately pull the retracting slide handle to the rear and release it; observe whether the round is ejected.
  - b. If a round is ejected, press the trigger and attempt to fire. If the gun does not fire and the barrel is hot enough to cause a cook off, wait 5 minutes (with the bolt in the forward position) to preclude damage or injury in the event of a cook off.
  - c. If a round is not ejected or 5 minutes elapses, clear the gun and perform remedial action; inspect the cause of the stoppage.
  - d. After performing remedial action, reload, relay on the target, and attempt to fire.

**Evaluation Preparation:** Setup: Provide the soldier with equipment and materials listed in the conditions. You can evaluate this task in a classroom or training area using dummy linked caliber .50 ammunition.

**Brief Soldier:** Tell the soldier to load the weapon using the belt of ammunition.

<b>Performance Measures</b>	<b><u>GO</u></b>	<b><u>NO GO</u></b>
1. Ensure the bolt is forward and the cover is closed.	—	—
b. Insert the double-loop end of the belt in the feedway.		
d. Fire the weapon.		
2. Perform immediate action.	—	—
2. Insert the double-loop end of the belt into the feedway until the belt-holding pawl holds the first round.	—	—
a. Pull the bolt to the rear and eject the bad round within 10 seconds.		
b. Resume firing.		
3. Pull the retracting slide handle to the rear and release it. If the bolt latch release is up, return the retracting slide handle to the forward position, then release the bolt.	—	—
3. Unload and clear.	—	—
a. Cold gun.		
(1) Raise the cover.		
(2) Lift the extractor from the belt.		
(3) Lift the belt from the feedway.		
(4) Pull the bolt to the rear.		
(5) Check the T-slot and chamber for rounds.		
b. Hot gun.		
(1) Place the gun in the single-shot mode.		
(2) Fire the round in the chamber.		
(3) Open the cover.		
(4) Remove the belt from the feedway.		
(5) Release the bolt.		
(6) Close the cover and fire the round.		
(7) Check the T-slot and the chamber for rounds.		
4. Pull the retracting slide handle to the rear a second time and release it. When the bolt goes forward the second time, the gun is loaded.	—	—

**Evaluation Guidance:** If the soldier passes all steps, score him GO. If he fails any steps, score him NO-GO, then show him what he did wrong and how to do it correctly.

#### **References** **Required**

**Related**  
FM 23-65  
TM 9-1005-213-10

## Correct Malfunctions of a Caliber .50 M2 Machine Gun

### 071-022-0005

**Conditions:** Given a caliber .50 M2 machine gun, a belt of linked caliber .50 ammunition, a cleaning kit, a headspace and timing gauge, an assistant, and a requirement to correct malfunctions that occur.

**Standards:** Interruptions in the cycle of functioning caused by faulty action of the machine gun or faulty ammunition are eliminated without damage to the machine gun or injury to personnel.

### Performance Steps

1. Take immediate action to correct a failure to fire.
  - a. On a cool weapon, that is, one that has fired fewer than 150 rounds in 2 minutes-
    - (1) Hold the weapon on target.
    - (2) Wait 5 seconds in case the weapon has a hangfire.
    - (3) Pull the bolt to the rear. Return the retracting slide handle to its forward position. If the bolt locks to the rear, depress the bolt latch to return the bolt to the forward position.
    - (4) Try to fire. If the weapon fires, you have corrected the stoppage.
    - (5) IF the weapon fails to fire, wait 5 seconds, pull the bolt to the rear, and lock it in the rearward position (engage with bolt latch). Return the retracting slide handle to its forward position.
    - (6) Proceed to Step 2, remedial action.
  - b. On a hot weapon, that is, one that has fired 150 or more rounds in 2 minutes-
    - (1) Hold the weapon on target.
    - (2) Wait 5 seconds in case there is a hangfire.
    - (3) Within the next 5 seconds, pull the bolt to the rear, return the retracting slide handle to its forward position, and try to fire. If the weapon fires, you have corrected the stoppage.
    - (4) If the weapon fails to fire, or if you were unable to retract the bolt during Step 1b(3), then you must keep the cover closed and wait 15 minutes to allow the weapon to cool.
    - (5) Go to Step 2.

**DANGER: NEVER OPEN THE COVER ASSEMBLY ON A HOT WEAPON. THE WEAPON COULD COOK OFF, WHICH COULD DAMAGE THE WEAPON AND, MORE IMPORTANTLY, COULD KILL OR INJURE PERSONNEL.**

**APPLY IMMEDIATE ACTION TO A HOT WEAPON WITHIN 10 SECONDS. IF YOU ARE UNABLE TO EITHER FIRE OR REMOVE THE ROUND WITHIN 10 SECONDS, THEN YOU MUST WAIT ANOTHER 15 MINUTES BEFORE YOU CAN DO ANYTHING ELSE TO THE WEAPON.**

2. Take remedial action.
  - a. Open the cover assembly and check for faulty ammunition or an obstruction in the barrel assembly and chamber.
  - b. If a cartridge is in the T-slot of the bolt, and if it does not fall out, then hold the bolt to the rear, raise the extractor, and use a screwdriver to push the cartridge out the bottom of the receiver.
  - c. If a ruptured (separated) cartridge case is in the T-slot, remove it with a cleaning rod or ruptured cartridge extractor.
    - (1) When using the ruptured extractor, raise the cover. Pull and lock the bolt to the rear. Place the extractor in the T-slot the same way you would with a cartridge. Use the gun's extractor assembly ejector to hold the extractor in line with the bore. When the extractor is aligned with the bore, let the bolt go forward into the ruptured case. The shoulders will spring out in front of the case. Pull the bolt to the rear and remove the ruptured case and extractor.
    - (2) When using a cleaning rod, raise the cover. Pull and lock the bolt to the rear. Insert the cleaning rod in the front end of the barrel. Gently push the ruptured cartridge from the chamber.
  - d. Reload and try to fire the weapon. If the weapon does not fire, continue remedial action.
  - e. Disassemble the weapon and inspect for dirt, obstructions, and defective parts.



**Performance Steps**

- f. Clean the weapon, remove, obstructions, and replace defective parts. Lubricate and assemble the weapon.
  - g. Set or adjust headspace and timing.
  - h. Replace faulty ammunition.
  - i. If the weapon still fails to fire, notify your supervisor.
3. Take immediate action to stop uncontrolled automatic fire (runaway gun).
- a. Perform one of three actions:
    - Hold the weapon on target until it stops firing.
    - Have the assistant gunner twist the belt, causing the gun to jam.
    - Allow the weapon to fire remaining ammunition.
  - b. If you have fired all your ammunition, check to ensure the weapon is clear, and go to Step 3c. If you have not fired all your ammunition, and the weapon is hot (is has fired more than 150 rounds in less than 2 minutes), keep the cover assembly closed and wait 15 minutes, then proceed to Step 3c.
  - c. Disassemble the weapon and inspect for defective parts.
  - d. Clean the weapon, remove obstructions, replace defective parts, lubricate and assemble the weapon.
  - e. Check headspace and timing, and adjust them if necessary.
  - f. If the weapon still fails to fire properly, notify your supervisor.
4. Correct sluggish operation.
- a. Clear the weapon.
  - b. Disassemble, clean, and lubricate the weapon.
  - c. Assemble the weapon.
  - d. Set headspace and timing.

**Evaluation Preparation:** Setup: You an evaluate this task at a test site rather than on a live-fire range. Provide the materials and equipment listed in the task conditions statement. Give the soldier caliber .50 linked dummy rounds instead of live rounds. Insert an expended round in the belt to cause a stoppage.

**Brief Soldier:** Tell the soldier to assume a firing position behind the caliber .50 machine gun and to apply any required immediate action. Tell the soldier that the test does not require him or her to perform remedial action. Ask the soldier to describe the actions to perform for remedial action on cold and hot weapons, sluggish operation, and a runaway weapon.

**Performance Measures****GO**    **NO GO**

- |  |                           |
|--|---------------------------|
| <p>1. Take immediate action for failure to fire within 10 seconds.</p> <ul style="list-style-type: none"> <li>a. Hold the weapon on target.</li> <li>b. Wait 5 seconds in case the weapon has a hangfire.</li> <li>c. Within the next 5 seconds, pull the bolt to the rear, return the retracting slide handle to its forward position, and try to fire.</li> <li>d. If the weapon fails to fire, wait 5 seconds and take appropriate remedial action.</li> </ul>  | <p>_____</p> <p>_____</p> |
| <p>2. Take remedial action on a cool weapon.</p> <ul style="list-style-type: none"> <li>a. Open the cover assembly.</li> <li>b. Remove the ammunition belt.</li> <li>c. Remove the ruptured cartridge and all obstructions from the T-slot, barrel assembly, and chamber.</li> <li>d. Reload and fire the weapon.</li> <li>e. If the weapon does not fire, disassemble it, and inspect it for dirt, obstructions, and defective parts.</li> <li>f. Clean the weapon, remove obstructions, replace defective parts, lubricate it, assemble it, and set the headspace and timing.</li> </ul> | <p>_____</p> <p>_____</p> |

**Performance Measures****GO**    **NO GO**

- |   |   |   |
|---|---|---|
| <ul style="list-style-type: none"> <li>g. Replace faulty ammunition.</li> <li>h. If the weapon still fails to fire, notify your supervisor.</li> </ul>  | <div style="border-bottom: 1px solid black; width: 40px; margin: 0 auto;"></div> <div style="border-bottom: 1px solid black; width: 40px; margin: 0 auto;"></div> | <div style="border-bottom: 1px solid black; width: 40px; margin: 0 auto;"></div> <div style="border-bottom: 1px solid black; width: 40px; margin: 0 auto;"></div> |
| <ul style="list-style-type: none"> <li>3. Take remedial action on a hot weapon.               <ul style="list-style-type: none"> <li>a. Keep the cover closed and wait 15 minutes to allow the weapon to cool.</li> <li>b. Perform the same procedures as for cool weapon after waiting period.</li> </ul> </li> </ul>  | <div style="border-bottom: 1px solid black; width: 40px; margin: 0 auto;"></div>  | <div style="border-bottom: 1px solid black; width: 40px; margin: 0 auto;"></div>  |
| <ul style="list-style-type: none"> <li>4. Take action to stop uncontrolled automatic fire (runaway gun).               <ul style="list-style-type: none"> <li>a. Perform one of three actions:                   <ul style="list-style-type: none"> <li>- Hold the weapon on target until it stops firing.</li> <li>- Have the assistant gunner twist the belt, causing the gun to jam.</li> <li>- Allow the weapon to fire remaining ammunition.</li> </ul> </li> <li>b. Take the appropriate remedial action based on whether the weapon is hot or cold.</li> </ul> </li> </ul> | <div style="border-bottom: 1px solid black; width: 40px; margin: 0 auto;"></div>  | <div style="border-bottom: 1px solid black; width: 40px; margin: 0 auto;"></div>  |
| <ul style="list-style-type: none"> <li>5. Correct sluggish operation.               <ul style="list-style-type: none"> <li>a. Clear the weapon.</li> <li>b. Disassemble, clean, and lubricate the weapon.</li> <li>c. Assemble the weapon.</li> <li>d. Set headspace and timing.</li> </ul> </li> </ul>   | <div style="border-bottom: 1px solid black; width: 40px; margin: 0 auto;"></div>  | <div style="border-bottom: 1px solid black; width: 40px; margin: 0 auto;"></div>  |

**Evaluation Guidance:** If the soldier passes all steps, score him GO. If he fails any steps, score him NO-GO, then show him what he did wrong and how to do it correctly.

**References****Required****Related**

FM 23-65

TM 9-1005-213-10

## Subject Area 9: Basic Communication

**Communicate by Using Visual Signals****052-225-1210**

**Conditions:** As a combat engineer in a field environment, given three flags (a red, a yellow, and a green), a flashlight, and a situation which requires communication by the use of visual signals.

**Standards:** Demonstrate the correct visual signals.

**Performance Steps**

NOTE: Visual signals can be transmitted by the use of flags, lights, pyrotechnics, panels, hand and arm, and other prearranged means. They are suitable for rapidly transmitting prearranged messages over short distances and for aiding in the recognition and identification of friendly forces. It is important to know all of the visual signals on the battlefield (refer to Field Manual [FM] 21-60); however, it is more important to know the signals that assist you in performing a specific job.

1. Demonstrate the required visual signals according to FM 21-60.

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions.

Brief soldier: Tell the soldier to be very familiar with FM 21-60. They will be required to demonstrate various visual communication signals shown in the manual.

**Performance Measures****GO    NO GO**

1. Demonstrated all visual signals correctly.

\_\_\_\_\_

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

**References**

**Required**  
FM 21-60

**Related**

## Perform Operator's Troubleshooting on SINCGARS

**113-587-0058**

**Conditions:** Given a nonoperational SINCGARS, TM 11-5820-890-10-1, TM 11-5820-890-10-8, DA Pam 738-750, power source, and DA Form 2404.

**Standards:** The standards are met when equipment defects are resolved and unit is restored to operation, or deferred to a higher maintenance level.

### Performance Steps

1. Perform operator troubleshooting procedures in sequence IAW TM11-5820-890-10-3.

### Performance Measures

**GO**    **NO GO**

1. Perform operator troubleshooting procedures in sequence IAW TM 11-5820-890-10-8.

\_\_\_\_\_

\_\_\_\_\_

**Evaluation Guidance:** Score the soldier GO if all steps are passed. Score the soldier NO-GO if any step is failed. If the soldier fails any step, show what was done wrong and how to do it correctly. Have the soldier practice until he can correctly perform the task.

### References

#### Required

DA FORM 2404

DA PAM 738-750

TM 11-5820-890-10-1

TM 11-5820-890-10-3

TM 11-5820-890-10-8

#### Related

## Operate SINCGARS Single-Channel (SC)

### 113-587-2070

**Conditions:** Given an operational SINCGARS, KYK-13/TSEC with keys or AN/CYZ-10, C-11291 CM, distant station, TM 11-5820-890-10-8, TM 11-5820-890-10-3, TM 11-5820-890-10-1, ACP 125 US Suppl-1, DA Pam 738-750, FM 24-19, FM 24-18, and unit SOI or ANCD w/SOI data loaded.

**Standards:** The standards are met when a secure communications check is conducted in SC mode with a distant station and the radio functions are changed using the CM.

### Performance Steps

1. Perform starting procedures.
2. Load traffic encryption key (TEK).
3. Enter net.
  - a. Use correct procedures.
  - b. Conduct secure communications check.
4. Prepare control monitor for operation.
5. Change radio functions using the control monitor.
6. Exit net.
7. Perform stopping procedures.

**Evaluation Preparation:** Setup: Ensure radio set is complete and operational with CM install on radio. Brief soldier: Tell the soldier all performance measures must be completed correctly within 20 minutes. All performance measures must be done in sequence.

Performance Measures	<u>GO</u>	<u>NO GO</u>
1. Performed starting procedures.	_____	_____
2. Loaded traffic encryption key (TEK).	_____	_____
3. Entered net.	_____	_____
4. Prepared control monitor for operation.	_____	_____
5. Changed radio functions using the control monitor.	_____	_____
6. Exited the net.	_____	_____
7. Performed stopping procedures.	_____	_____

**Evaluation Guidance:** Score the soldier GO if all steps are passed. Score the soldier NO-GO if any step is failed. If the soldier fails any step, show what was done wrong and how to do it correctly. Have the soldier practice until the task can be performed correctly.

### References

#### Required

ACP 125 US SUPPL-1  
DA PAM 738-750  
FM 24-18  
FM 24-19  
TM 11-5820-890-10-3

#### Related

ACP 125 US SUPP-1  
TM 11-5820-890-10-1

**References**

**Required**

TM 11-5820-890-10-8  
UNIT SOI

**Related**

## Operate SINCGARS Frequency Hopping (FH) (Net Members)

### 113-587-2071

**Conditions:** Given an operational SINCGARS radio, ECCM fill device with FH data, KYK-13/TSEC with keys, C-11291 CM, distant net control station (NCS), unit SOI, DA Form 2404, TM 11-5820-890-10-8, TM 11-5820-890-10-3, TM 11-5820-890-10-1, ACP 125 US Suppl-1, DA Pam 738-750, FM 24-19, and FM 24-18.

**Standards:** The standards are met when FH communications is established using the cold start and CUE late net entry methods, the radio check is successfully completed, and the radio functions are changed using the CM.

### Performance Steps

1. Perform starting procedures. (Set radio to PLGR (AN/PSN-11) time)
2. Perform net member cold start procedures.
  - a. Use correct call signs.
  - b. Use correct procedures.
3. Perform net member CUE late net entry.
  - a. Use correct call signs.
  - b. Use correct procedures.
4. Prepare control monitor for operation.
5. Change radio functions using the control monitor.
6. Perform stopping procedures.

**Evaluation Preparation:** Setup: Ensure radio set is complete and operational with CM installed on radio set. Brief soldier: Tell the soldier all performance measures must be completed correctly within 20 minutes. All performance measures must be done in sequence.

Performance Measures	<u>GO</u>	<u>NO GO</u>
1. Performed starting procedures. (Set Radio to PLGR (PSN-11) time).	_____	_____
2. Performed net member cold start procedures.	_____	_____
3. Performed net member CUE late net entry.	_____	_____
4. Prepared control monitor for operation.	_____	_____
5. Changed radio functions using the control monitor.	_____	_____
6. Performed stopping procedures.	_____	_____

**Evaluation Guidance:** Score the soldier GO if all steps are passed. Score the soldier NO-GO if any step is failed. If the soldier fails any step, show what was done wrong and how to do it correctly. Have the soldier practice until he can correctly perform the task.

### References

#### Required

ACP 125 US SUPP-1  
 ACP 125 US SUPPL-1  
 DA FORM 2404  
 DA PAM 738-750  
 FM 24-18

#### Related

TM 11-5820-890-10-1

**References**

**Required**

FM 24-19

TM 11-5820-890-10-3

TM 11-5820-890-10-8

UNIT SOI

**Related**



## Subject Area 10: Fixed Bridging

**Identify Bailey Bridge Components****052-197-1130**

**Conditions:** As a bridge crew member at a fixed-bridge crossing site, given the components of the Bailey bridge and an erection set.

**Standards:** Correctly identify 23 out of 32 components on the Bailey bridge and the Bailey-bridge erection set.

**Performance Steps**

1. Identify the components of the Bailey bridge.
  - a. A panel is a main member of the bridge (Figure 052-197-1130-1). A panel requires six personnel to carry.

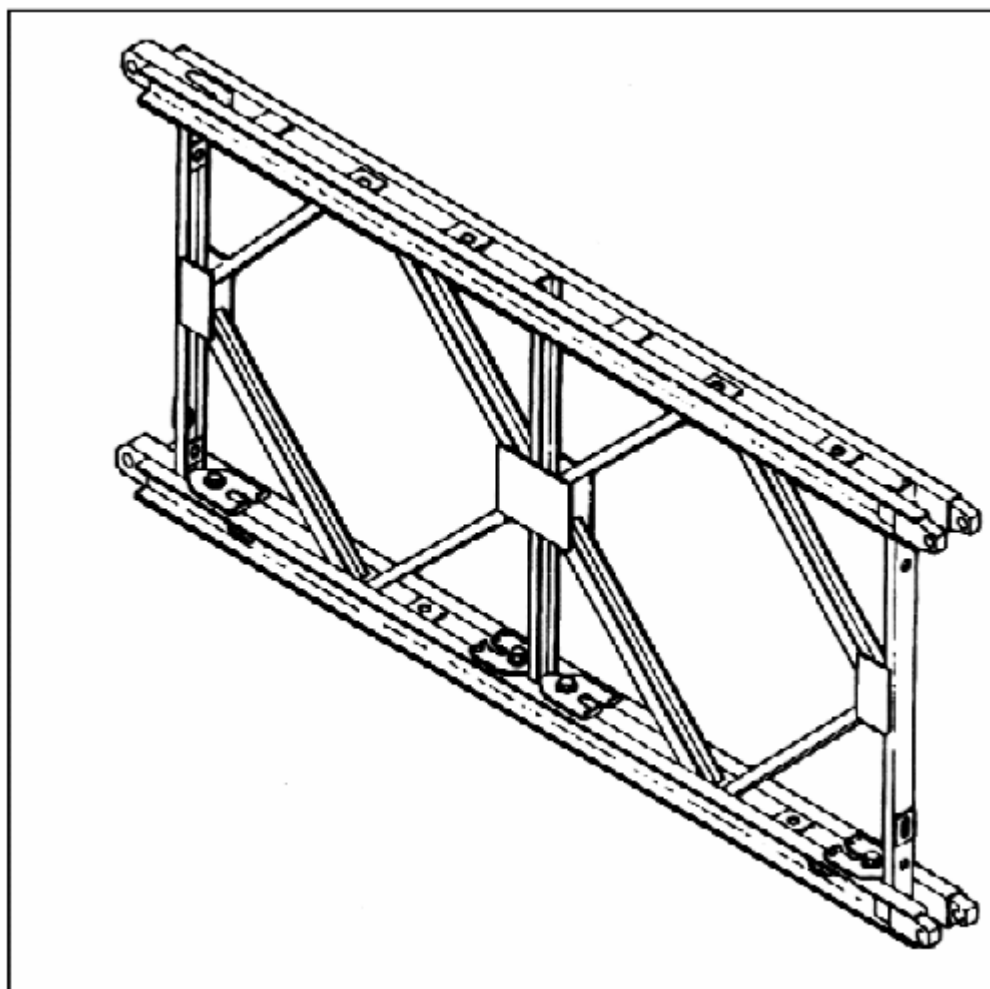


Figure 052-197-1130-1  
Panel

- b. A panel pin is used to hold the joining panels together (Figure 052-197-1130-2).

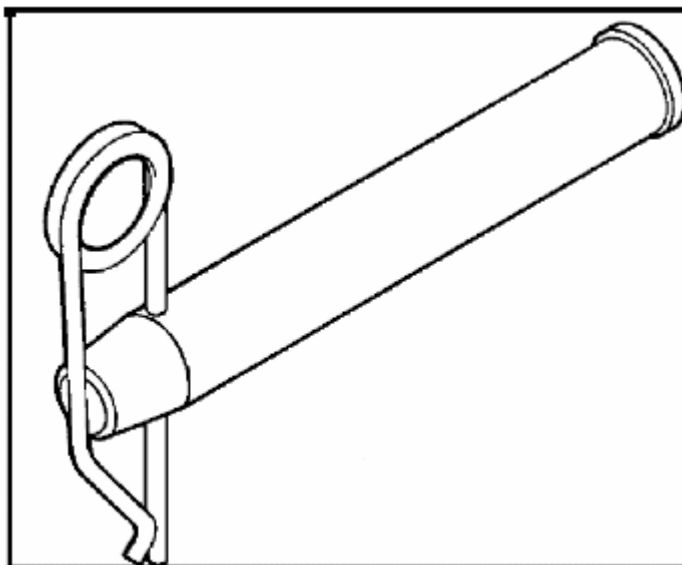
**Performance Steps**

Figure 052-197-1130-2  
Panel Pin

- c. A short panel pin is used to pin the end posts of the outer trusses on a triple bridge (Figure 052-197-1130-3).

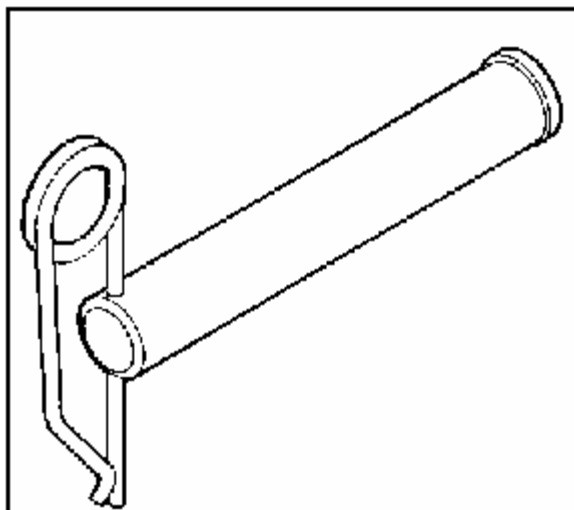


Figure 052-197-1130-3  
Short Panel Pin

- d. A transom is used to support the floor system of the bridge (Figure 052-197- 1130-4). A transom requires eight personnel to carry.

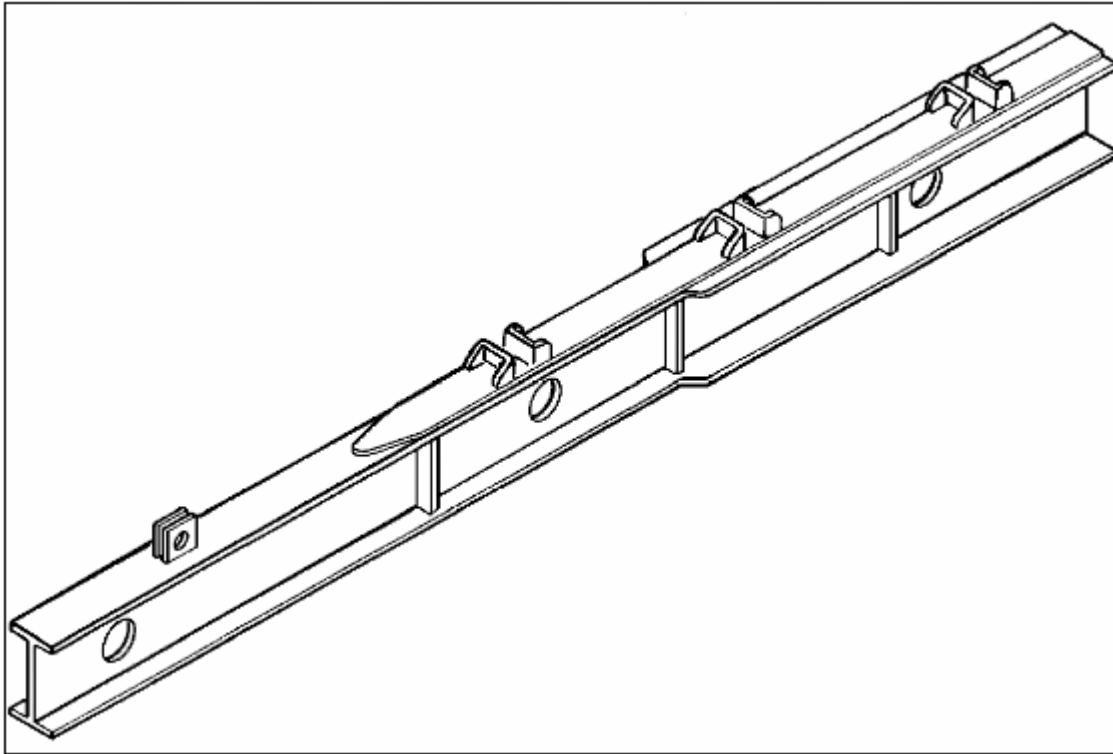
**Performance Steps**

Figure 052-197-1130-4  
Transom

- e. A transom clamp is used to clamp the transom to the vertical and bottom chord of the panel (Figure 052-197-1130-5).

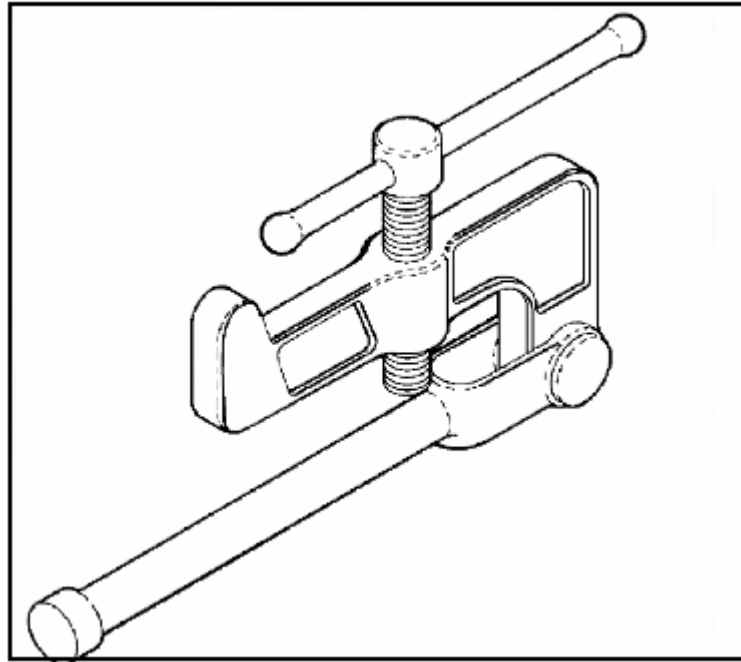
**Performance Steps**

Figure 052-197-1130-5  
Transom Clamp

- f. A sway brace is used as a cross member between the bay of each lower chord to keep the bridge from swaying and twisting (Figure 052-197-1130-6). A sway brace requires one person to carry and two personnel to place.

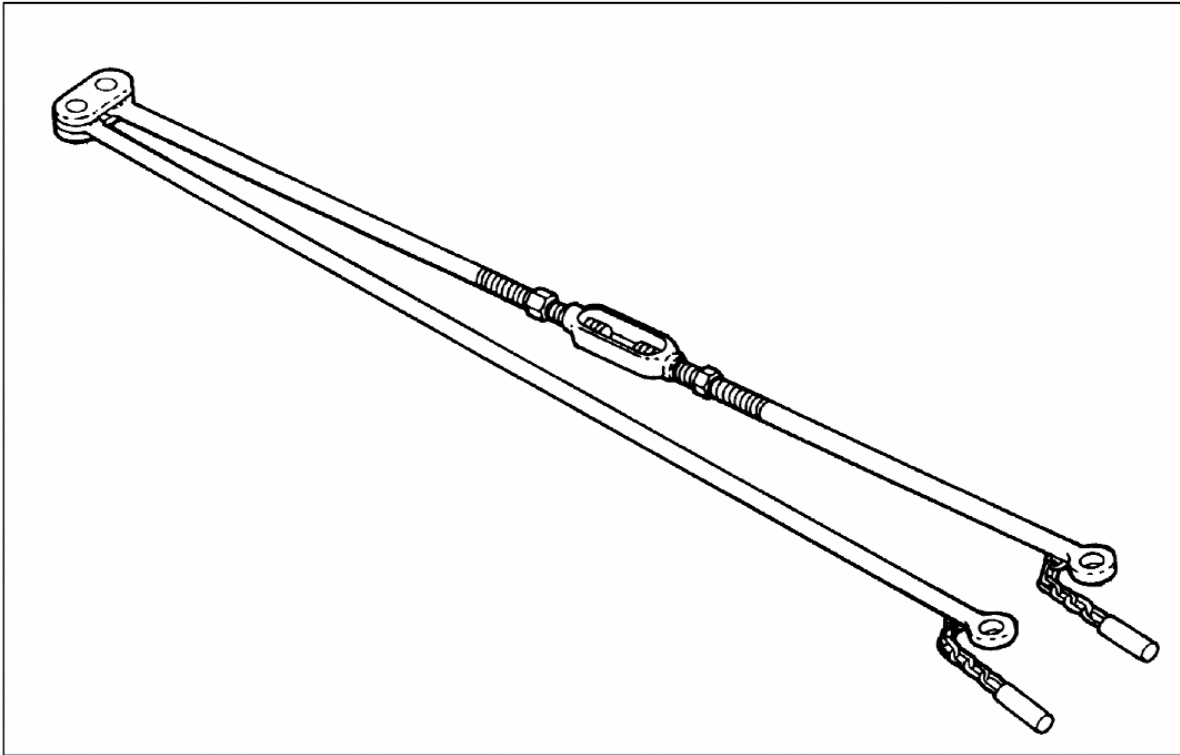
**Performance Steps**

Figure 052-197-1130-6  
Sway Brace

- g. A raker brace is used to connect the ends of the transom to the top of each panel of inner trusses (Figure 052-197-1130-7).

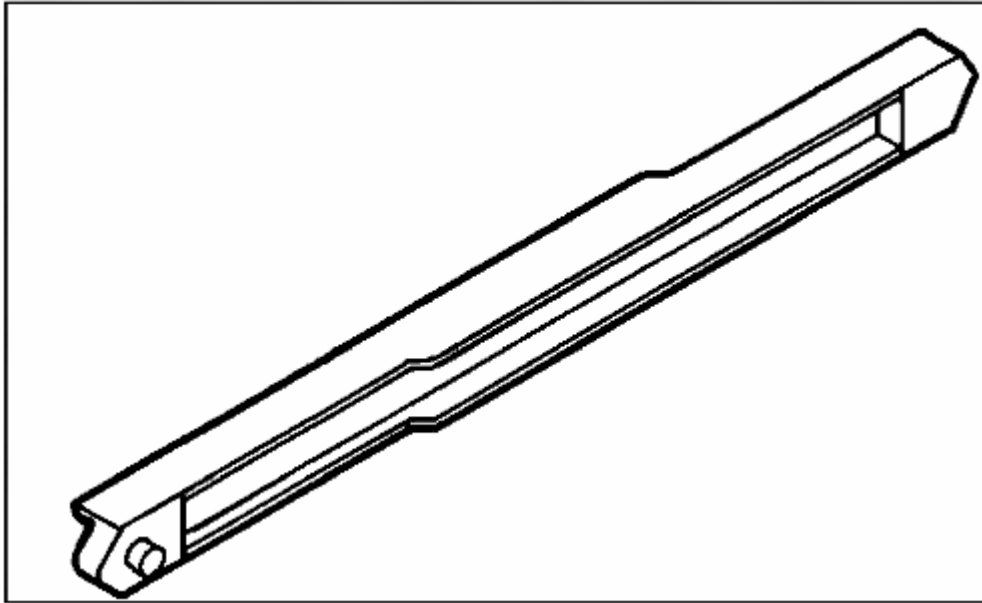
**Performance Steps**

Figure 052-197-1130-7  
Raker Brace

- h. A bracing frame is used to brace the two inner trusses on both sides of a double- and triple-truss bridge (Figure 052-197-1130-8).

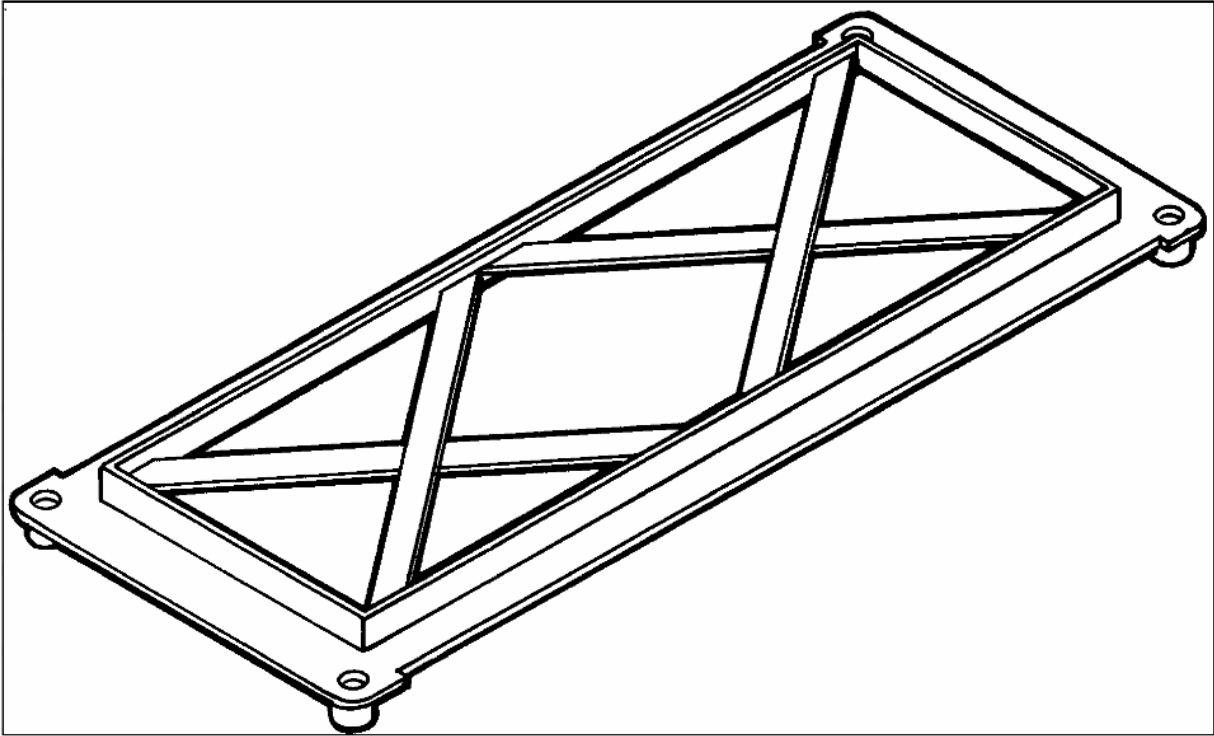
**Performance Steps**

Figure 052-197-1130-8  
Bracing Frame

- i. A tie plate is used only on a triple-truss bridge (Figure 052-197-1130-9). A tie plate secures the second truss to the third truss.

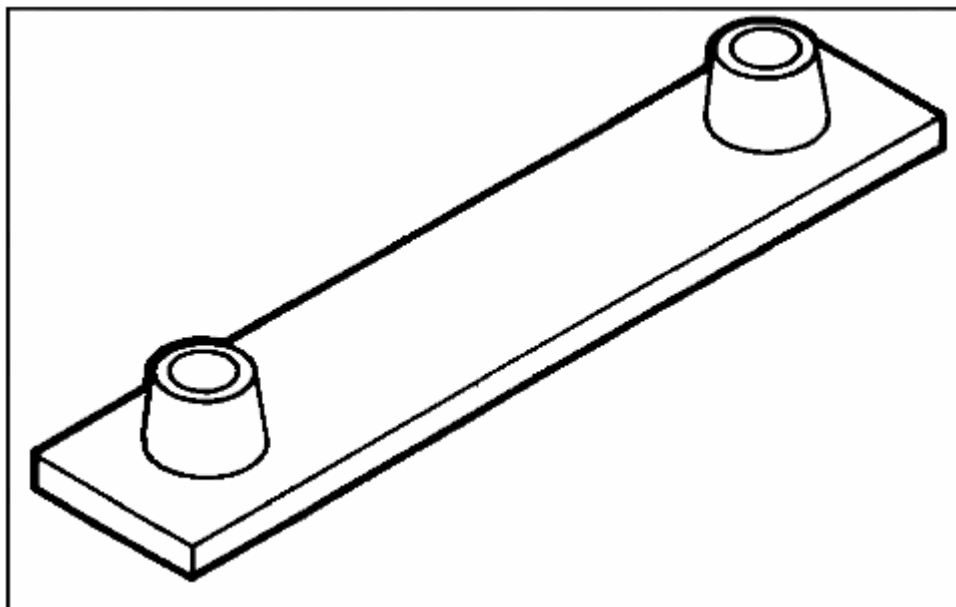


Figure 052-197-1130-9  
Tie Plate

**Performance Steps**

- j. A chord bolt is used to join the panels, one above the other, to form a double- or a triple-story bridge (Figure 052-197-1130-10).

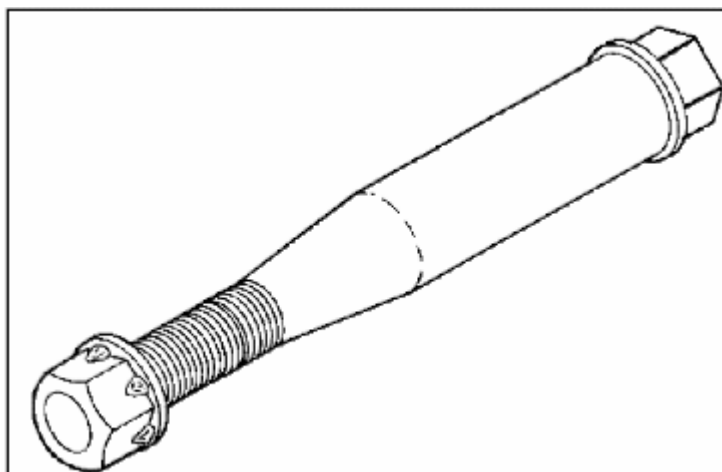


Figure 052-197-1130-10  
Chord Bolt

- k. A bracing bolt is used to attach rakers, bracing frames, and tie plates to panels (Figure 052-197-1130-11).

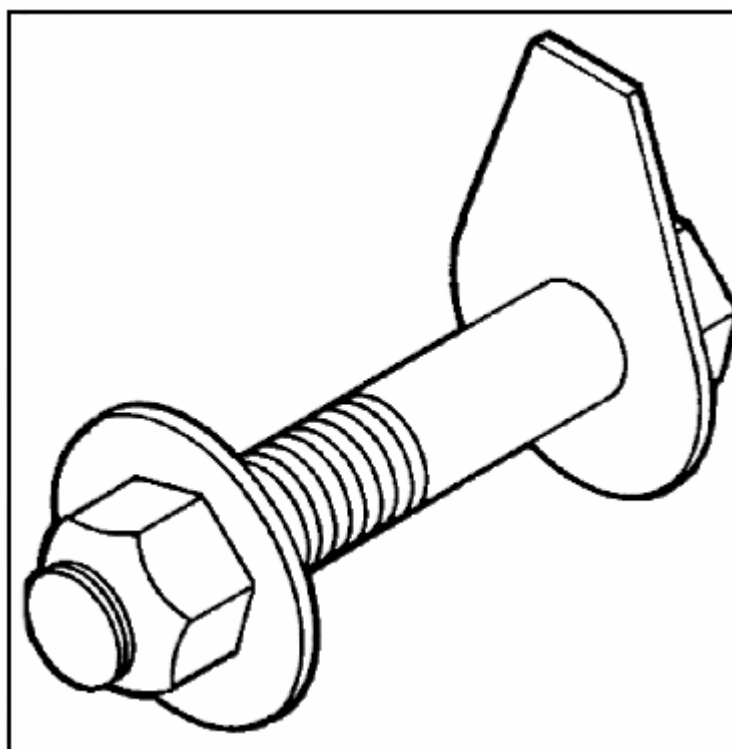


Figure 052-197-1130-11  
Bracing Bolt

- l. A button stringer is used to carry the bridge's roadway and hold the ends of the chess (Figure 052-197-1130-12). A button stringer requires four personnel to carry.



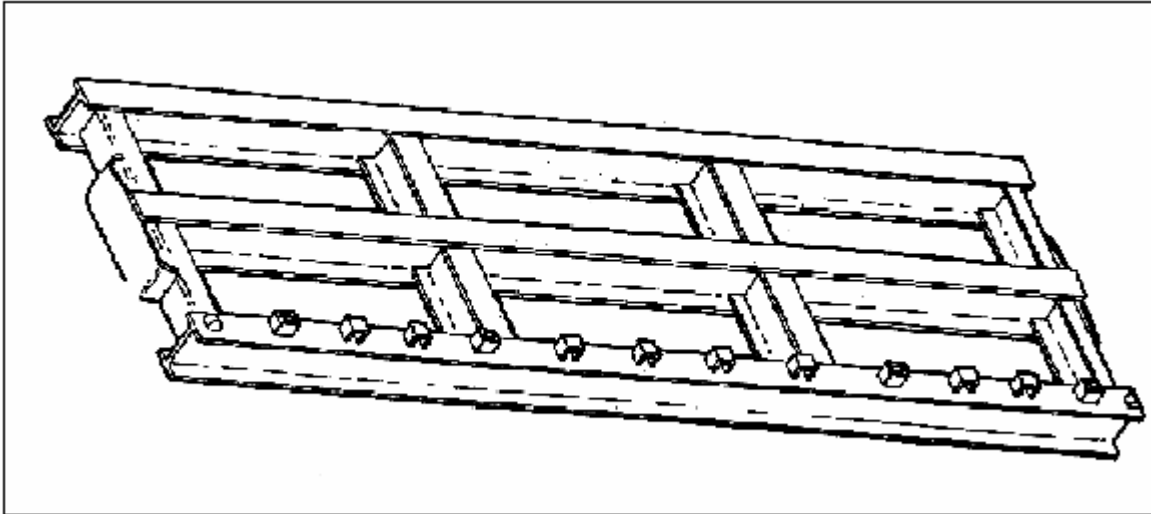
**Performance Steps**

Figure 052-197-1130-12  
Button Stringer

m. A chess is used to form the road surface (Figure 052-197-1130-13).

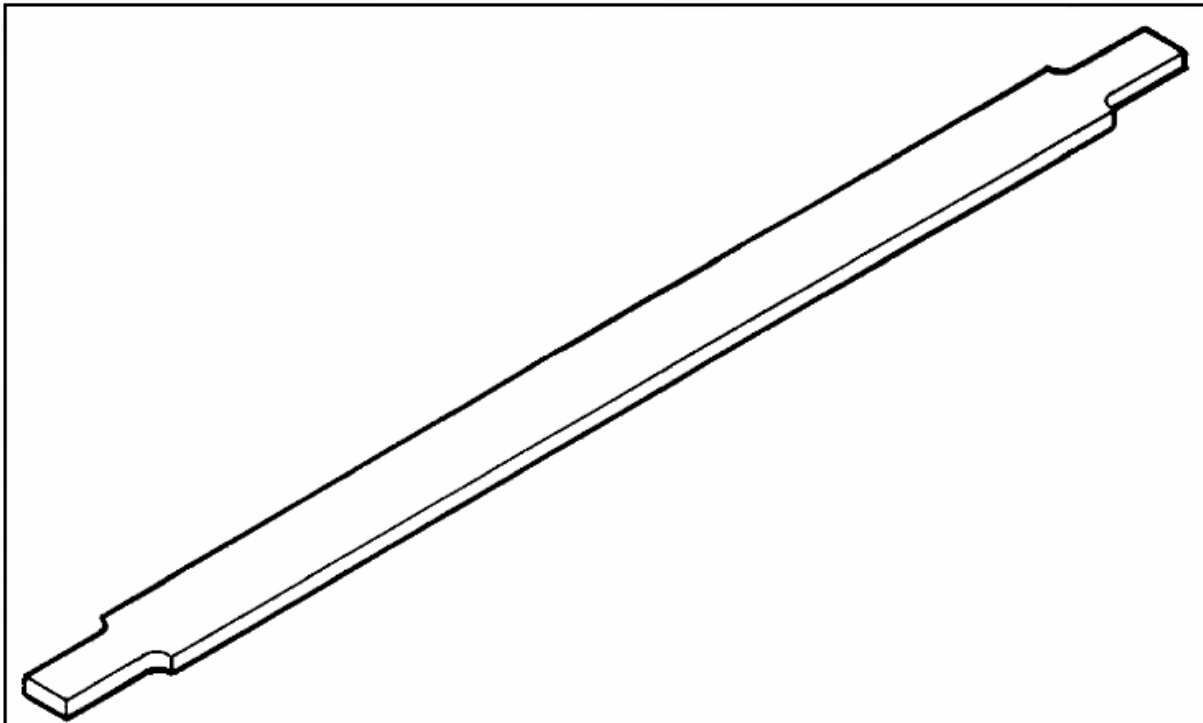


Figure 052-197-1130-13  
Chess

n. A ribband is used as a metal curb (Figure 052-197-1130-14). A ribband requires two personnel to carry.

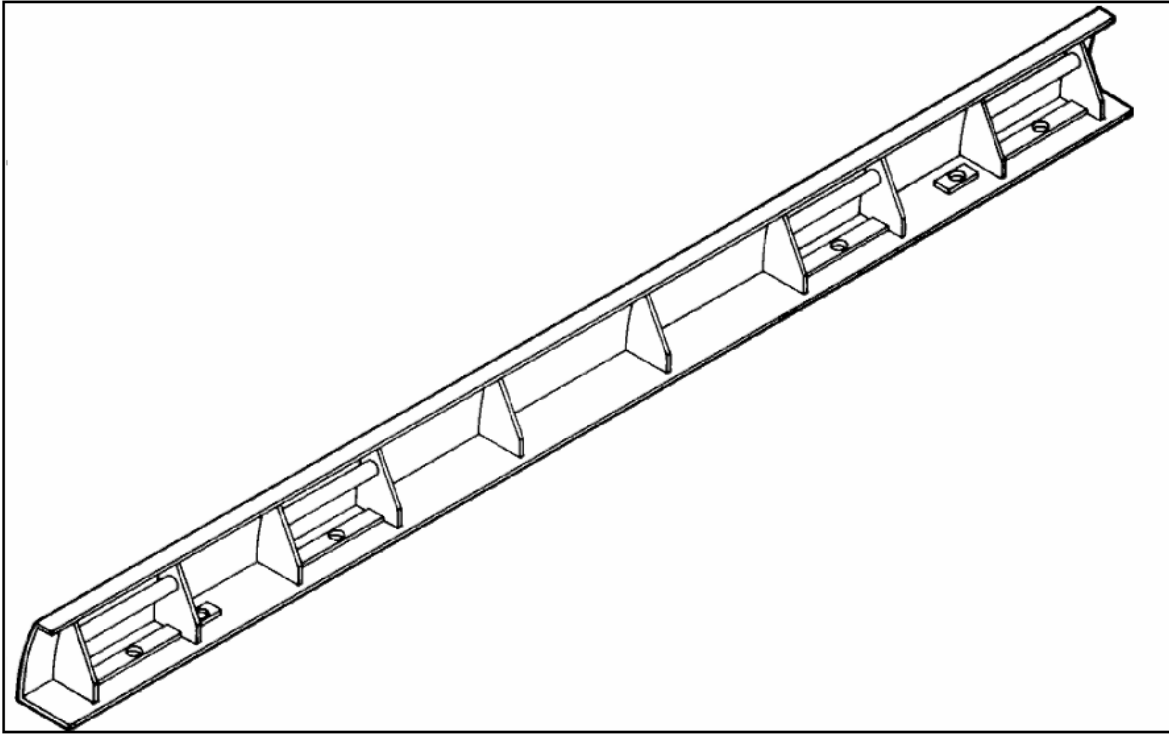
**Performance Steps**

Figure 052-197-1130-14  
Ribband

- o. A ribband bolt is used to hold the ribband in place. A ribband bolt fastens to the stringers (Figure 052-197-1130-15).

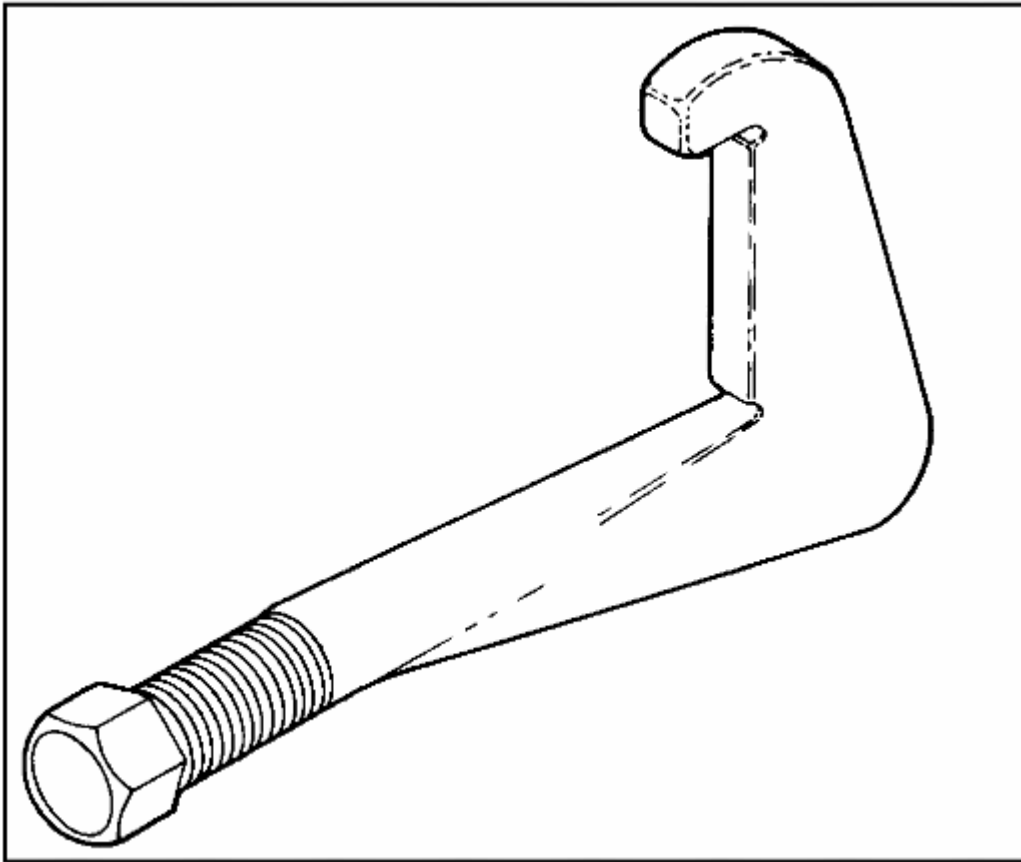
**Performance Steps**

Figure 052-197-1130-15  
Ribband Bolt

- p. A male-end post is used on the end of each truss to bare the force of the vertical shear (Figure 052-197-1130-16). A male-end post requires two personnel to carry.

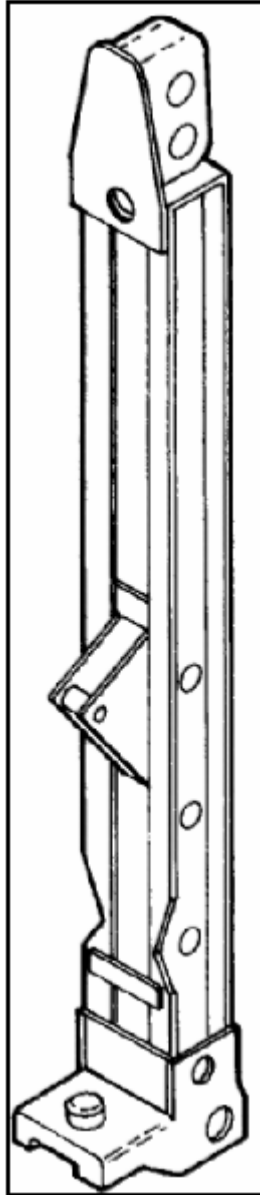
**Performance Steps**

Figure 052-197-1130-16  
Male-End Post

- q. A plain stringer is used in the middle section of the bridge and is used to bare the weight of the roadway (Figure 052-197-1130-17). A plain stringer requires four personnel to carry.

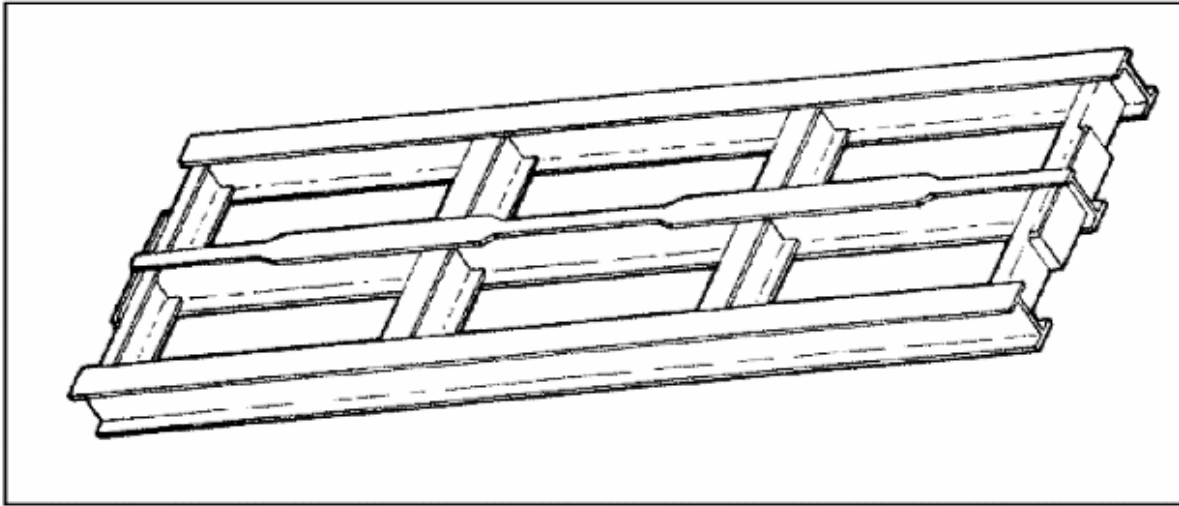
**Performance Steps**

Figure 052-197-1130-17  
Plain Stringer

- r. A female-end post is used on the end of each truss to take the vertical shear (Figure 052-197-1130-18). A female-end post requires two personnel to carry.

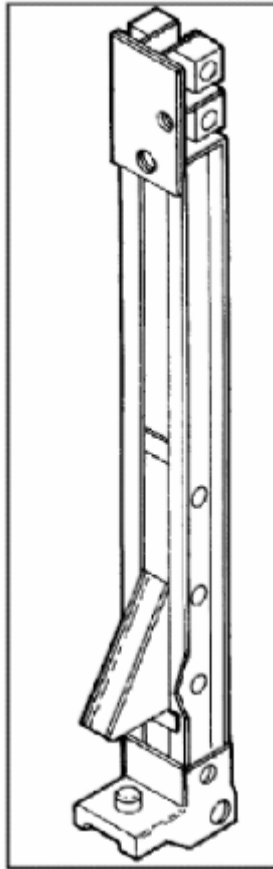
**Performance Steps**

Figure 052-197-1130-18  
Female-End Post

- s. A plain ramp is used in the middle section of the ramp on each end of the bridge. It has tapered ends (Figure 052-197-1130-19). A plain ramp requires four personnel to carry.

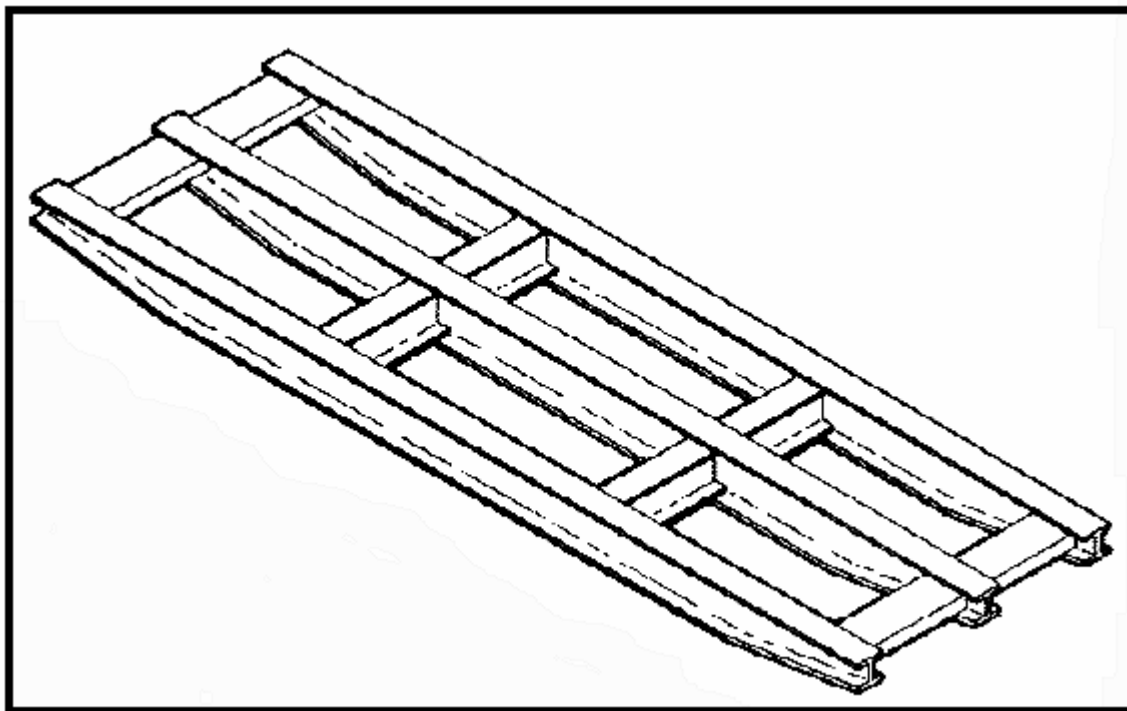
**Performance Steps**

Figure 052-197-1130-19  
Plain Ramp

- t. A button ramp is used as a ramp on the ends of the bridge. It has tapered ends and 12 buttons (Figure 052-197-1130-20). A button ramp requires four personnel to carry.

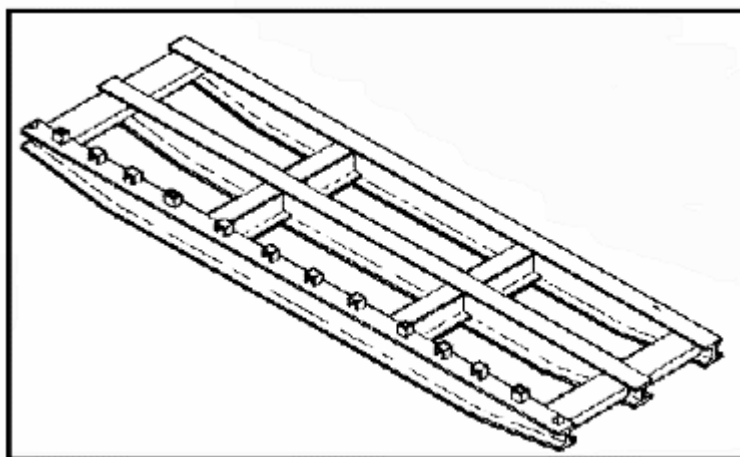


Figure 052-197-1130-20  
Button Ramp

- u. A ramp pedestal is used to prevent the transoms, which support the multiple-length ramps, from overturning. A ramp pedestal spreads out the transom load (Figure 052-197-1130-21).

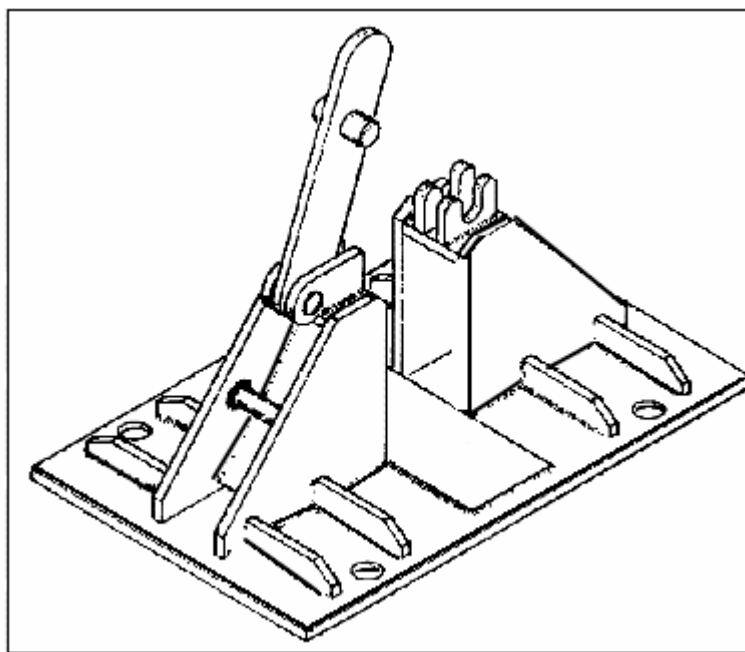
**Performance Steps**

Figure 052-197-1130-21  
Ramp Pedestal

2. Identify the components of the Bailey-bridge erection set.
  - a. A bearing is used to spread the load of the bridge on the base plate. A bearing is used under the end posts (Figure 052-197-1130-22).

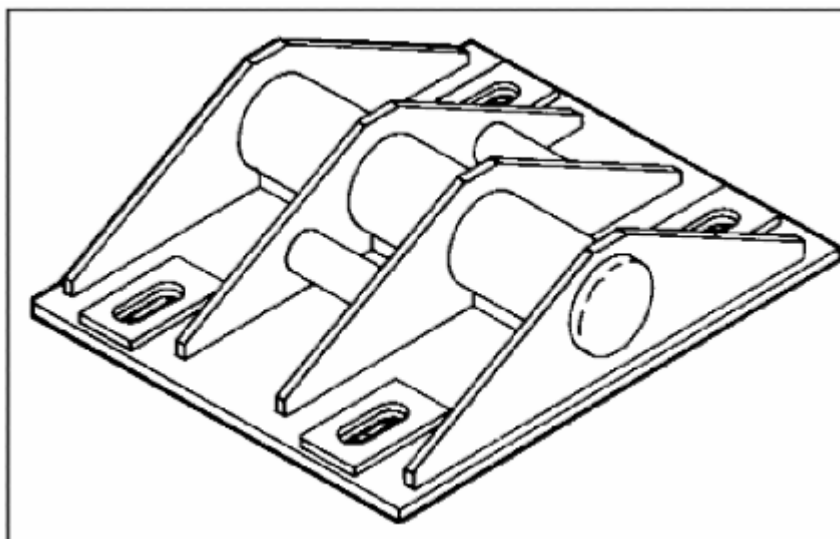


Figure 052-197-1130-22  
Bearing

- b. A base plate is placed under the bearing in order to spread out the load from the bearings (Figure 052-197-1130-23). A base plate requires four personnel to carry.



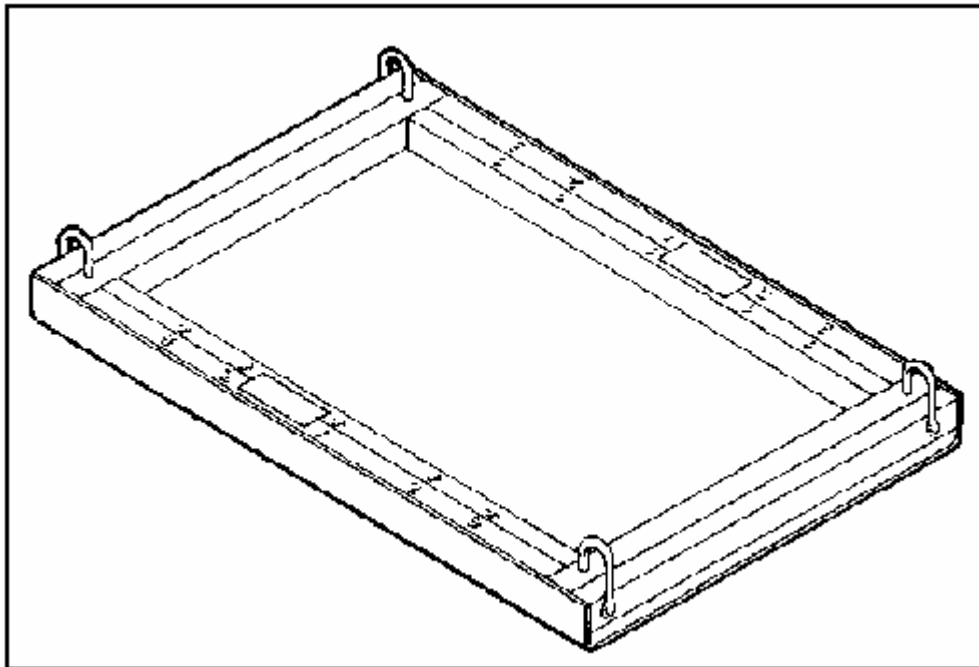
**Performance Steps**

Figure 052-197-1130-23  
Base Plate

- c. A rocking roller is used to aid in the bridge-load distribution. A rocking roller is placed along the bottom chord during the bridge's launching (Figure 052-197-1130-24). A rocking roller requires two personnel to carry.

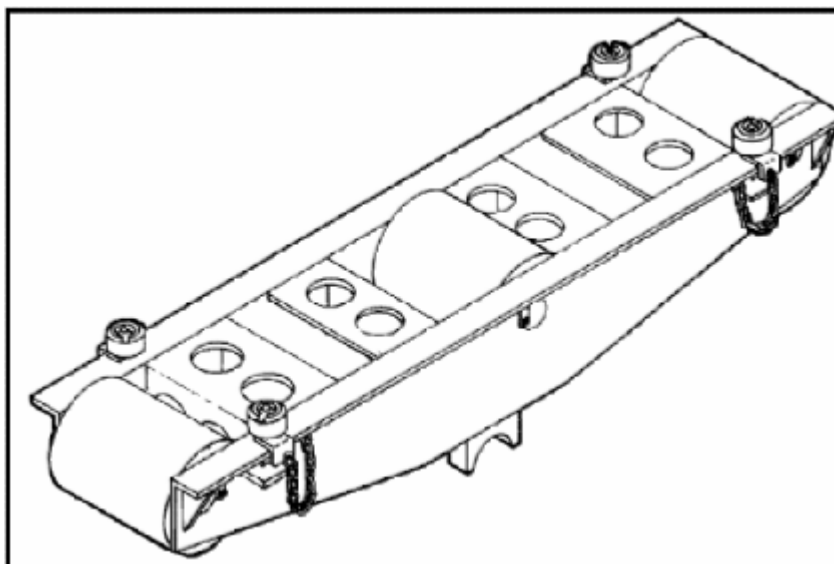


Figure 052-197-1130-24  
Rocking Roller

- d. A plain roller is used to keep the bridge off of the ground during construction (Figure 052-197-1130-25).

## Performance Steps

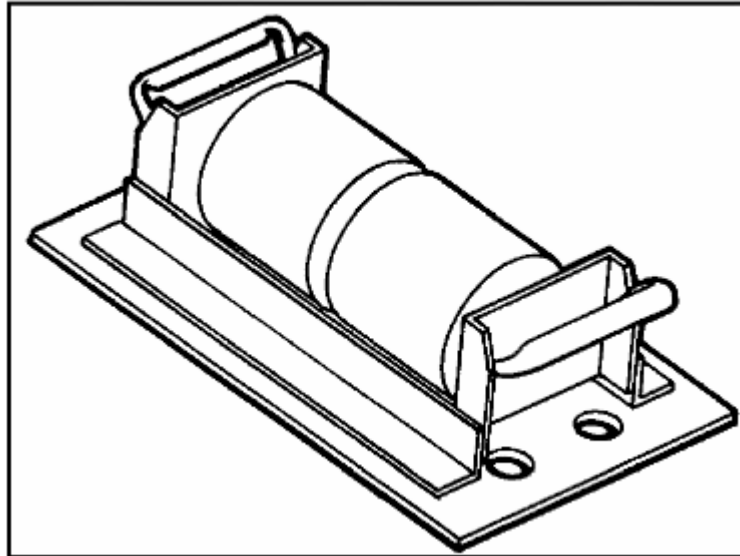


Figure 052-197-1130-25  
Plain Roller

- e. A transom roller is used to aid in the placement and the removal of the transom (052-197-1130-26).

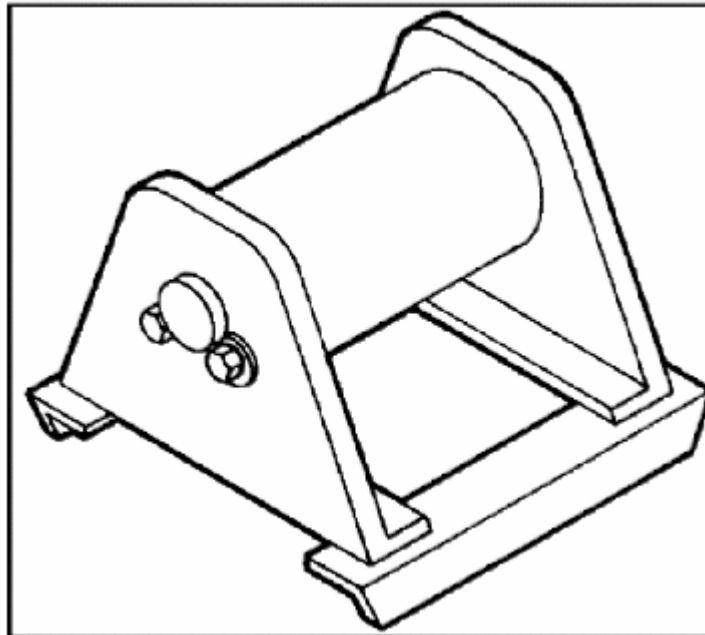


Figure 052-197-1130-26  
Transom Roller

- f. A plain-roller template is used to hold the plain rollers (Figure 052-197-1130-27).

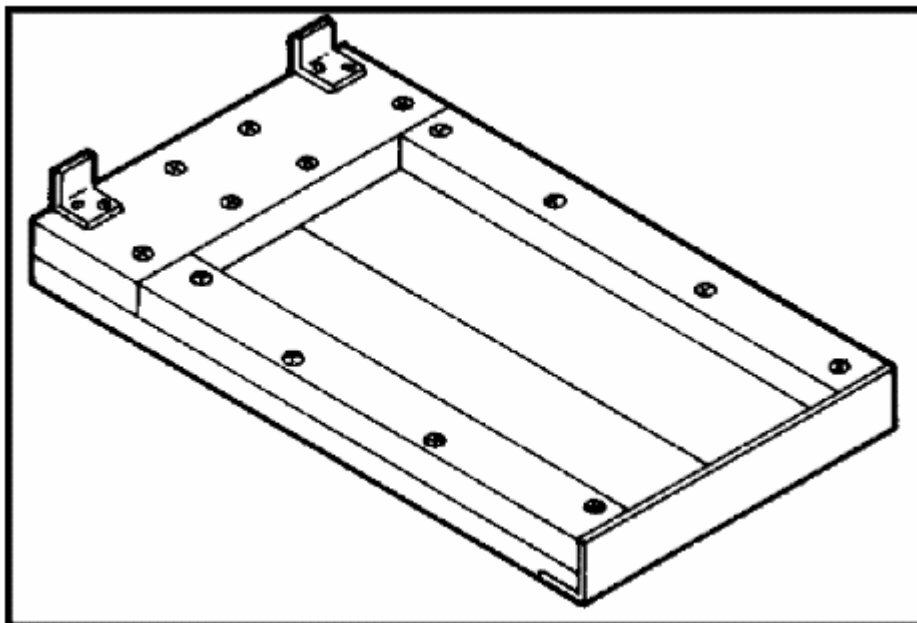
**Performance Steps**

Figure 052-197-1130-27  
Plain-Roller Template

- g. A rocking-roller template is used to hold the bearing and rocking rollers (Figure 052-197-1130-28).

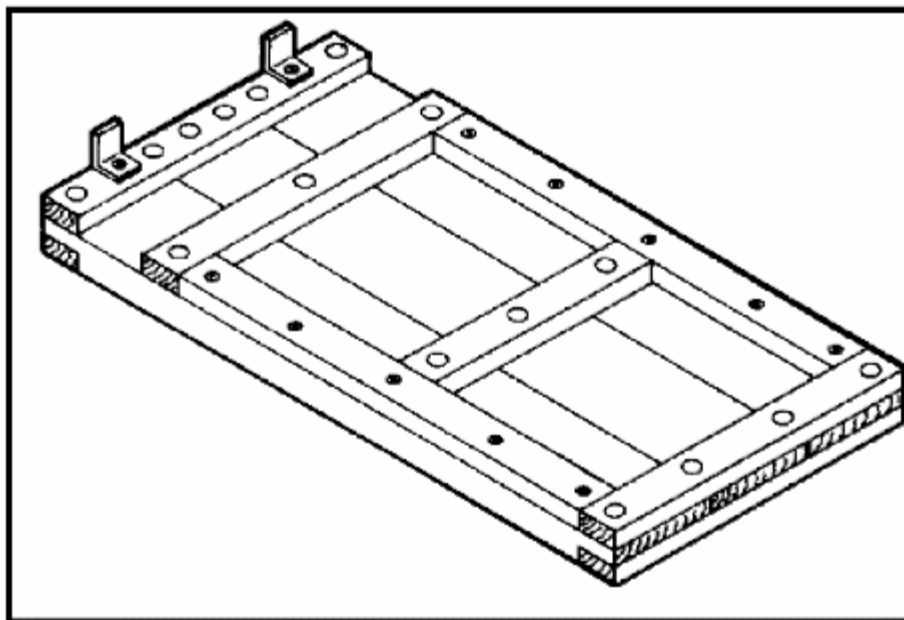


Figure 052-197-1130-28  
Rocking-Roller Template

- h. A launching-nose link MK II is used to overcome the sag, which may occur when the nose is launched over the gap (Figure 052-197-1130-29).

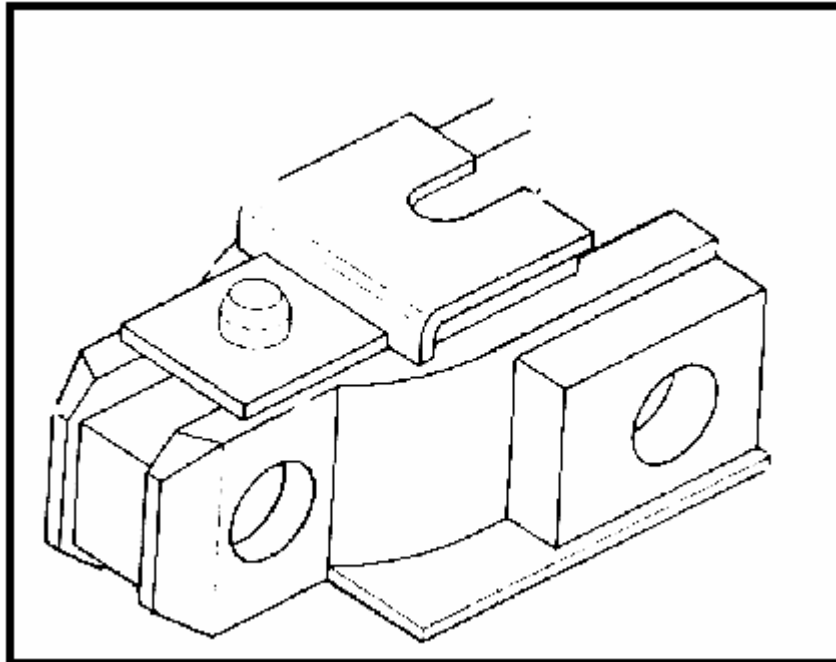
**Performance Steps**

Figure 052-197-1130-29  
Launching-Nose Link MK II

- i. A carrying bar is used to carry the panels (Figure 052-197- 1130-30). A carrying bar requires one person to carry and two personnel to utilize.

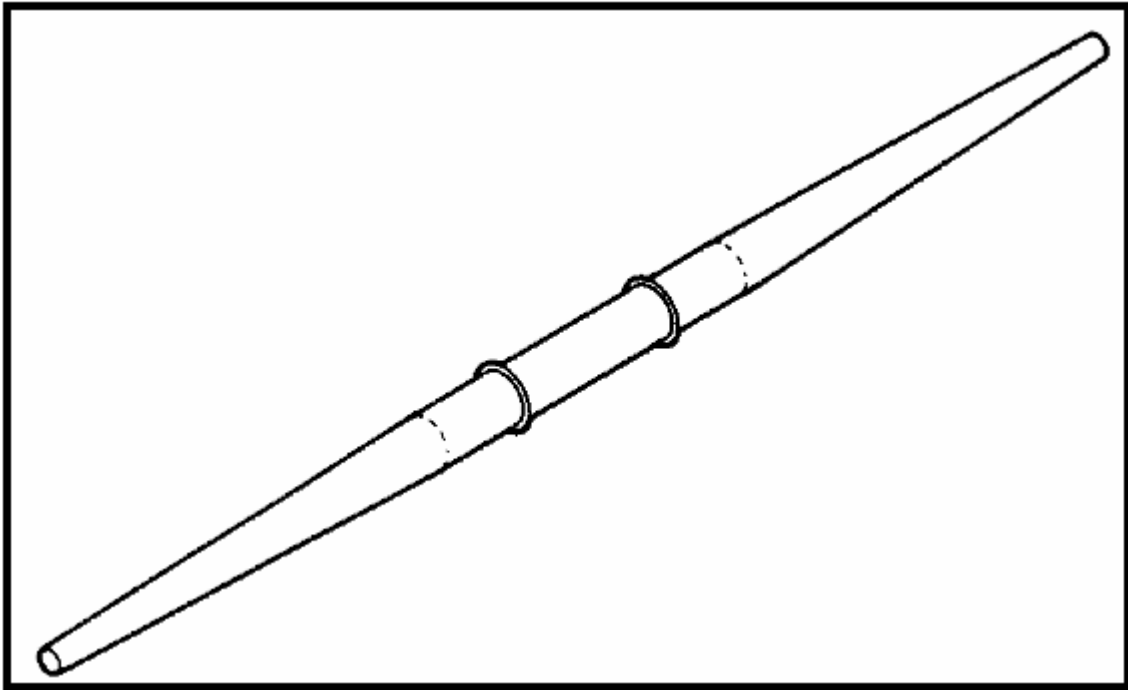
**Performance Steps**

Figure 052-197-1130-30  
Carrying Bar

- j. A carrying tong is used to carry the transoms (Figure 052-197-1130-31). A carrying tong requires one person to carry and two personnel to utilize.

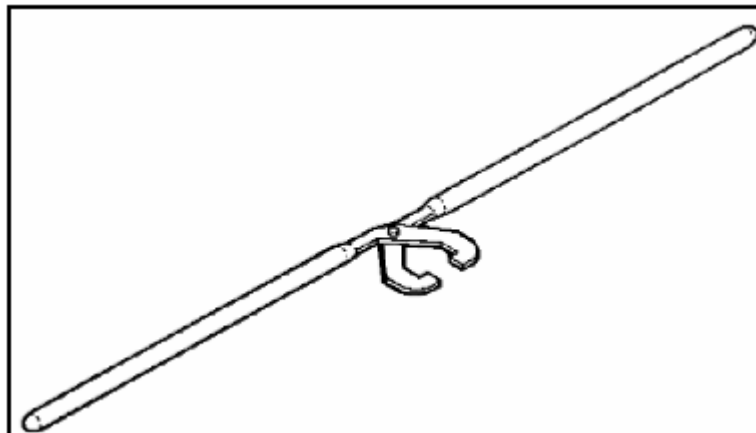


Figure 052-197-1130-31  
Carrying Tong

- k. A jack shoe is used to support the jack when moving the bridge up or down (Figure 052-197-1130-32).

Performance Steps

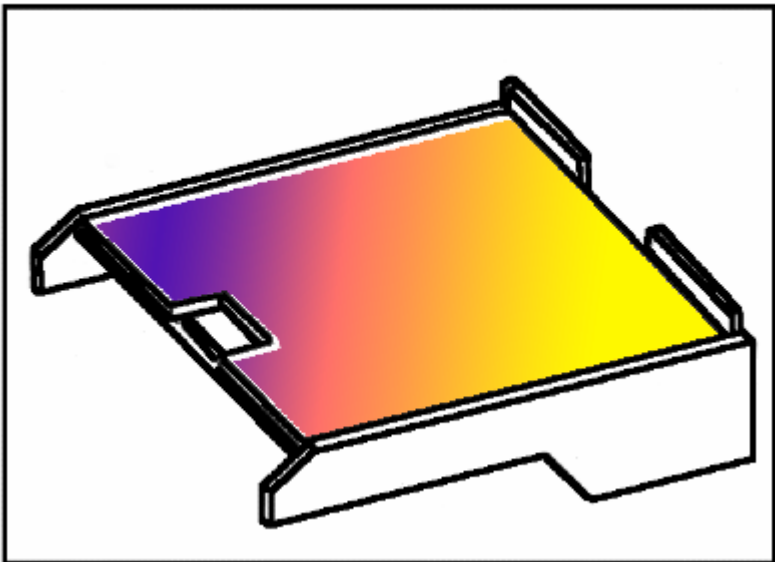


Figure 052-197-1130-32  
Jack Shoe

**Evaluation Preparation:** Setup: Provide the soldier with the items listed in the conditions. If the equipment is not available, pictures may be used. Separate the components into two groups: a bridge set and an erection set.

Brief soldier: Inform the soldier that he must correctly identify 23 out of the 32 components.

Performance Measures	<u>GO</u>	<u>NO GO</u>
1. Identified the components of the Bailey bridge.	_____	_____
2. Identified the components of the Bailey-bridge erection set.	_____	_____

**Evaluation Guidance:** Score the soldier GO if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show him how to do it correctly.

References Required	Related FM 5-277 STP 5-12C1-SM
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## Subject Area 11: Basic Individual Techniques

**Move as a Member of a Fire Team****071-326-0501**

**Conditions:** In a designated position (other than team leader) in a moving fire team.

**Standards:** You will react immediately to the fire-team leader's example by performing the same actions he does in the designated position within the formation.

**Performance Steps**

1. Fire team formations describe the relationship of the soldiers in the fire team to each other. Standard fire team formations are the wedge (Figure 1), modified wedge (Figure 2), diamond (Figure 3), and file (Figure 4).
  - a. Fire team wedge (Figure 1). This is the basic fire team formation. It has the following characteristics:

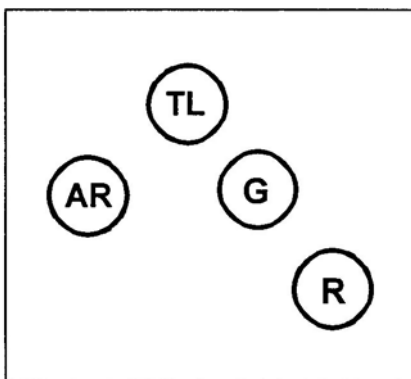


Figure 1  
Fire team wedge.

- (1) Is easy to control.
    - (2) Is flexible.
    - (3) Allows immediate fires in all directions.
    - (4) Provides all-round local security.
  - b. Modified wedge (Figure 2). When rough terrain, poor visibility, or other factors reduce control of the wedge formation, the sides are closed up to (almost) a single file. When moving in less rugged terrain and control becomes easier, soldiers resume their original positions. The modified wedge can also be used for extended periods when traveling on roads or trails. It has the following characteristics:

## Performance Steps

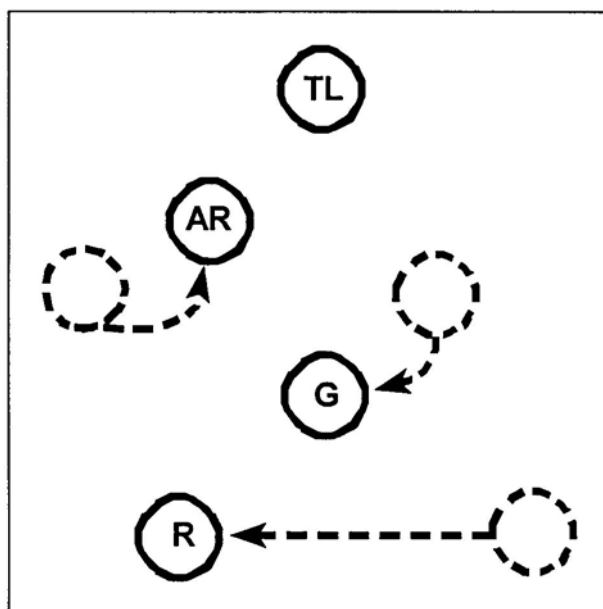


Figure 2  
Modified fire team wedge.

- (1) Is easier to control in reduced visibility or rough terrain.
  - (2) Provides less security to flanks than a wedge but more than a file.
  - (3) Masks fires initially to the front and rear for the majority of the team.
- c. Fire team diamond (Figure 3). This formation is a variation of the wedge. It is most often used when the fire team is operating alone or is the lead security element (point) for a column or file. It has the same characteristics as a wedge except there is--

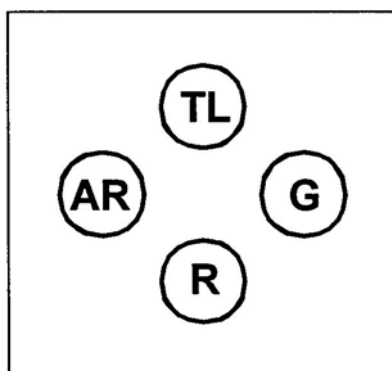


Figure 3  
Fire team diamond.

- (1) Reduced frontage.
  - (2) Increased security to the rear.
  - (3) Immediate fires in all directions, but one man's fires are always masked.
- d. Fire team file (Figure 4). When the fire team is not using a wedge or diamond formation, it uses the file. The characteristics of the file are--



Performance Steps

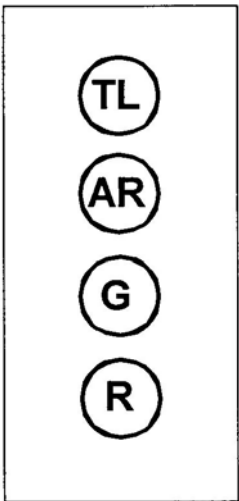


Figure 4  
Fire team file.

- (1) Provides maximum control.
  - (2) Provides minimum frontage. It is the easiest formation to use in close terrain or vegetation.
  - (3) Facilitates speed of movement.
  - (4) Is less flexible than the wedge or diamond.
  - (5) Provides immediate fires to flanks, but it masks most soldier's fires to the front and rear.
2. The distances between soldiers in the formation depend on the terrain, visibility, and control factors. The normal interval in daylight is about 10 meters. Formations should not be held rigid, but should vary according to the factors of mission, enemy, terrain, troops, and time available (METT-T).
- a. The interval is increased in open terrain.
  - b. The interval is decreased when visibility is limited by underbrush, terrain , darkness, smoke, or dense fog.
  - c. The normal interval is resumed as soon as conditions permit.

**Evaluation Preparation:** Setup: This task will be tested during a platoon or larger tactical exercise. The fully combat equipped soldier will move as part of a fire team, operating as part of a platoon conducting a dismounted movement to contact. The soldier may act as any duty position except team leader.

**Brief Soldier:** Tell the soldier that he is a member of a fire team moving within the fire team formation, that he must use proper movement techniques within the formation as dictated by terrain and visibility, and that he must follow the team leader's instructions or signals.

Performance Measures	GO	NO GO
1. Keeps relative distance within the formation.	—	—
2. Maintains visual contact with the team leader.	—	—
3. Performs the same action as the team leader while maintaining relative position.	—	—
4. Maintains the appropriate interval within the formation based on visibility, terrain, and the team leader's instructions and signals.	—	—
5. Assumes the proper position within the formation as the formation changes.	—	—

**Evaluation Guidance:** If the soldier passes all steps, score him GO. If he fails any steps, score him NO-GO, then show him what he did wrong and how to do it correctly.

**References****Required**

FM 7-8

STP 7-11BCHM1-SM

**Related**

FM 7-7

FM 7-7J

## Perform Movement Techniques During MOUT

### 071-326-0541

**Conditions:** You are a member of an assault element in urban terrain. The enemy location and strength are uncertain. You are given an individual weapon with ammunition and load bearing equipment.

**Standards:** You will perform a visual reconnaissance to determine the next position. Using proper movement techniques, you will then move rapidly to the next covered or concealed position with minimum exposure to enemy fire.

#### Performance Steps

NOTE: 1. Individual, fire team, and squad movement techniques within urban terrain differ slightly from the basic movements used in normal field operations. Several movement techniques take on added importance during combat in urban terrain because of the special nature of the battle area. 2. In an urban terrain, the individual soldier and leaders are confronted with different types of obstacles that must be negotiated to eliminate or capture an enemy position. Street-to-street and house-to-house fighting give rise to many surprising situations, so alertness and all-round security are mandatory. The enemy may appear not only from the front, flanks, and rear, but also from above and below as well.

1. Follow general rules of movement:
  - a. Take care not to be silhouetted in doors or windows, or on rooftops.
  - b. Avoid open areas (streets, alleys, parks).
  - c. Make a visual reconnaissance of the next position before moving.
  - d. Conceal movement with smoke or covering fires, and by using buildings, rubble, and vegetation.
  - e. Always move rapidly from one position to another.
  - f. Be alert and expect the unexpected.

2. Observe around corners.

NOTE: Corner are hazardous to untrained soldiers who are not alert. The most common mistakes untrained soldiers make are: first, not recognizing the danger area; second, extending their weapons beyond the corner, which exposes their presence; and third, showing their heads at a height that enemy soldiers would expect to see them.

- a. Lie flat on the ground, weapon at the side, then move forward slowly, ensuring that the weapon is not forward of the corner.
- b. Expose the head slowly at ground level so that it appears to be a shadow. Expose the head only enough to observe around the corner (Figure 1).

## Performance Steps

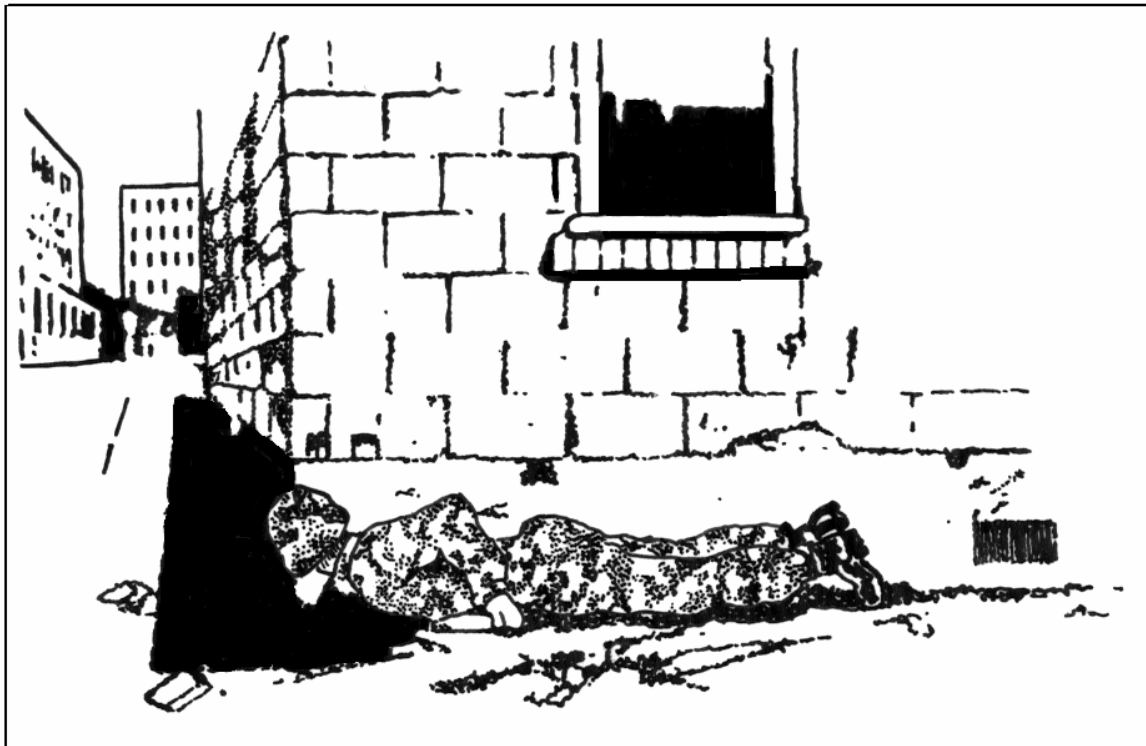


Figure 1  
Observing around a corner.

### 3. Move across open areas.

NOTE: Open areas, such as streets, alleys, and parks, are to be avoided when possible. They are natural kill zones for enemy crew-served weapons. They can be crossed with less risk if basic cautions are applied.

- a. Make a visual reconnaissance of the area and position.
- b. Select a route that has some cover or concealment. If no cover or concealment is available, use smoke or covering fire provided by the rest of the element.
- c. Move in the most direct route to the selected position. Using the most direct route will reduce the time of exposure to enemy fire. Also, moving rapidly will deny the enemy the opportunity to place well-aimed shots.
- d. Move from position to position without masking covering fires. When the next position is reached, be prepared to cover the movement of other members of the fire team or squad (Figure 2).

**Performance Steps**

Figure 2  
Moving from cover to cover.

- e. When two or more soldiers must move at the same time to another position--
  - (1) The group must first position themselves so they are prepared to move to their next position.
  - (2) The group, on a planned signal, moves across the open area at the same time to the next position. When moving, they should stay about 5 meters apart (Figure 3).

## Performance Steps

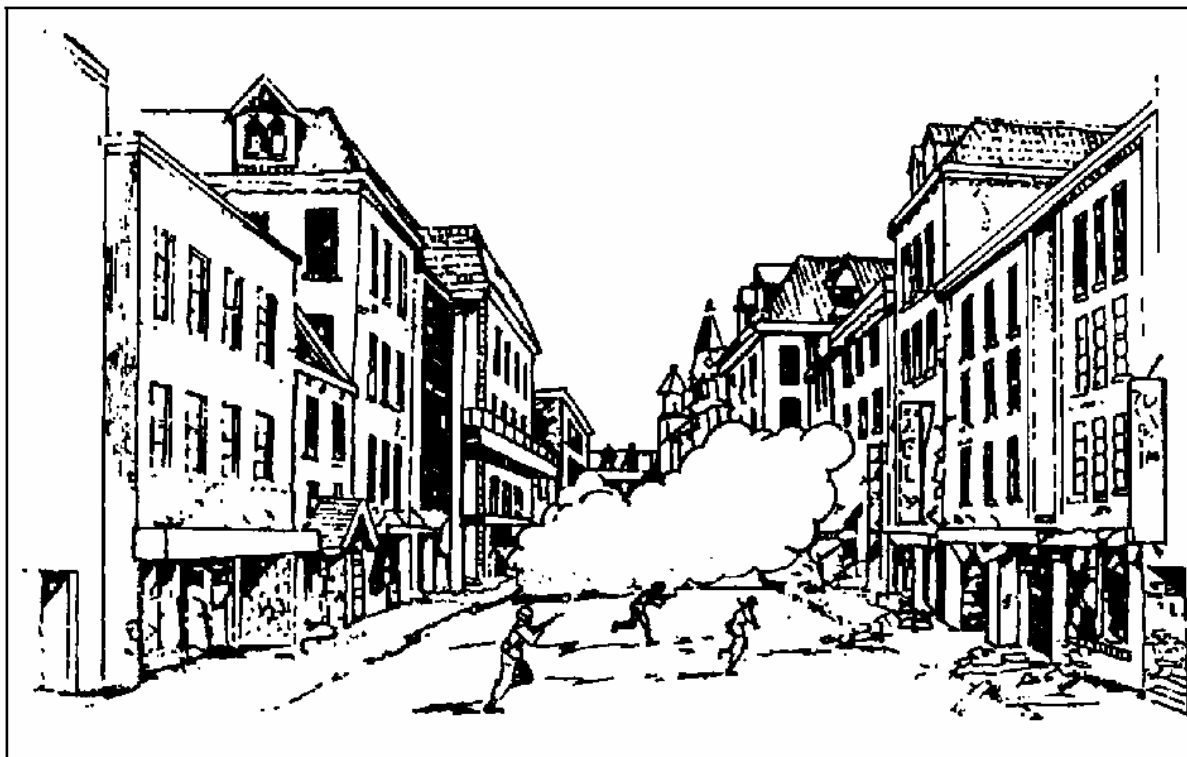


Figure 3  
Group moving to the next position.

### 4. Move parallel to buildings.

a. Move along the walls. When moving parallel to a building, move along the wall as closely as possible. That will deny an enemy soldier inside the building the chance to fire without exposing himself to fire from the covering force.

(1) Use all available cover and concealment move with a low silhouette and advance rapidly from position to position. If smoke is available, use it.

(2) When possible, move in the shadows, which helps to conceal movement.

b. Move past the first floor windows.

NOTE: Windows are danger points. Most first-floor windows are head high, and an unsuspecting soldier will expose his head, giving the enemy an excellent shot from cover.

(1) The right way to pass first-floor windows is to stay as close to the building as possible. When the window is reached, duck the head well below the window.

(2) Always take care not to be silhouetted in a window (Figure 4).

**Performance Steps**

Figure 4  
Movement past window.

c. Move past the basement windows.

- (1) Do not merely walk or run past a basement window; your legs will present a good target to an enemy gunner inside the building.
- (2) The right way to pass a basement window is to keep as close to the building as possible and, when you reach the window, step or jump above and pass the window without exposing your legs (Figures 5 and 6).

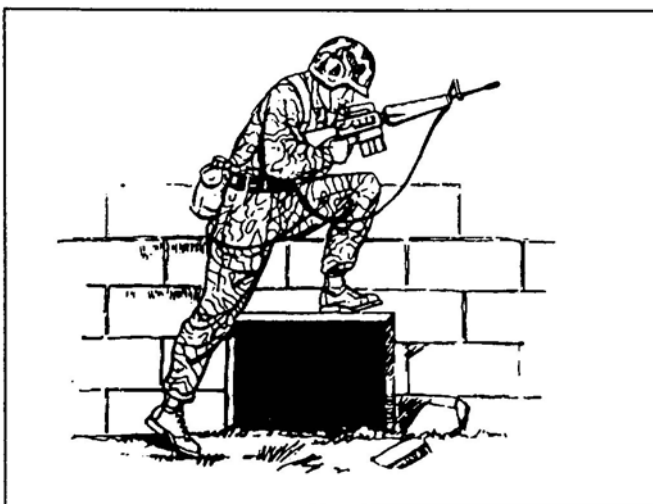


Figure 5  
Start of movement past basement window.

## Performance Steps

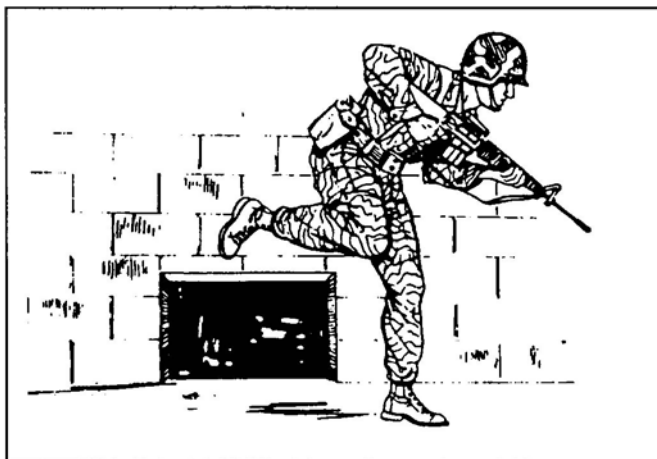


Figure 6  
Completion of movement past basement.

### 5. Cross obstacles (walls, fences, rooftops).

#### a. Move over walls and fences.

- (1) Before crossing a wall or fence, look at and beyond it for booby traps, enemy positions, and covered or concealed positions.
- (2) Move rapidly to the obstacle and roll quickly over it, keeping the lowest silhouette possible. Speed and a low silhouette deny the enemy a well-aimed shot.
- (3) Move rapidly to the nearest position while maintaining a low silhouette with the weapon at the ready position (Figure 7).

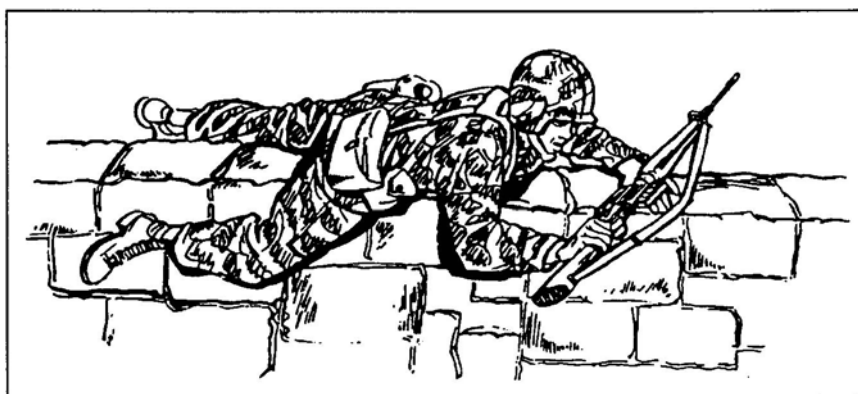


Figure 7  
Crossing of an obstacle.

#### b. Move over rooftops.

- (1) Make a visual reconnaissance of the area and of the route to the next position.
- (2) Move rapidly across the area, maintaining a low silhouette and using all available cover and concealment.

**Evaluation Preparation:** Setup: At the test site, provide all materials and equipment given in the task conditions statement.



Brief Soldier: Tell the soldier that he will be moving as a designated member of an assault element in urban terrain. The enemy strength and location are unknown.

<b>Performance Measures</b>	<b><u>GO</u></b>	<b><u>NO GO</u></b>
1. Follows the general rules of movement. <ul style="list-style-type: none"> <li>a. Does not silhouette self.</li> <li>b. Avoids open areas.</li> <li>c. Makes visual reconnaissance of the next position before moving.</li> <li>d. Conceals movement.</li> <li>e. Moves rapidly.</li> <li>f. Is alert.</li> </ul>	_____	_____
2. Observes around corners. <ul style="list-style-type: none"> <li>a. Lies flat, weapon at side; moves forward slowly.</li> <li>b. Exposes head slowly, at ground level, only long enough to observe around the corner.</li> </ul>	_____	_____
3. Moves across open areas. <ul style="list-style-type: none"> <li>a. Makes visual reconnaissance of area and position.</li> <li>b. Selects route with cover and concealment.</li> <li>c. Moves in the most direct route.</li> <li>d. Moves from position to position without masking covering fires.</li> <li>e. When two (or more) soldiers must move to the same position at the same time:               <ul style="list-style-type: none"> <li>(1) Position themselves to prepare to move together.</li> <li>(2) Move together at a planned signal.</li> <li>(3) Stay about 5 meters apart.</li> </ul> </li> </ul>	_____	_____
4. Moves parallel to the buildings. <ul style="list-style-type: none"> <li>a. Moves along the walls.               <ul style="list-style-type: none"> <li>(1) Moves parallel to the wall as closely as possible.</li> <li>(2) Moves rapidly with a low silhouette.</li> <li>(3) Moves in shadows when possible.</li> </ul> </li> <li>b. Moves past the first floor windows.               <ul style="list-style-type: none"> <li>(1) Stays close to the building; keeps head below window.</li> <li>(2) Does not silhouette self in window.</li> </ul> </li> <li>c. Moves past the basement windows.</li> <li>d. Steps or jumps over windows.</li> </ul>	_____	_____
5. Crosses obstacles. <ul style="list-style-type: none"> <li>a. Moves over walls or fences.               <ul style="list-style-type: none"> <li>(1) Checks the obstacle for booby traps, enemy positions, and covered and concealed positions.</li> <li>(2) Moves rapidly to the obstacle and quickly rolls over it; maintains a low silhouette.</li> <li>(3) Moves rapidly to the nearest position; maintains a low silhouette.</li> </ul> </li> <li>b. Moves over rooftops.               <ul style="list-style-type: none"> <li>(1) Makes a visual reconnaissance of the area and route.</li> <li>(2) Moves rapidly across the area, maintains a low silhouette, and uses all available cover.</li> </ul> </li> </ul>	_____	_____

**Evaluation Guidance:** If the soldier passes all steps, score him GO. If he fails any steps, score him NO-GO, then show him what he did wrong and how to do it correctly.

**References**

**Required**

STP 7-11BCHM1-SM

**Related**

**APPENDIX A - TRAINING AMMUNITION**

A-1. This appendix lists the mines and explosives, live and inert, required to support the training of critical tasks for skill levels 1 and 2 of military occupational specialty (MOS) 51B.

A-2. Training ammunition. The two types of training ammunition are live and inert.

a. Types of live ammunition include--

- (1) Demolition charge block 1/4 pound trinitrotoluene (TNT) block demolition charge
- (2) M11 branch line
- (3) M12 transmission
- (4) M9 holders used for blasting
- (5) M60 fuse igniter
- (6) M142 multipurpose firing device
- (7) M11 nonelectric blasting cap
- (8) Detonating cord
- (9) M14 blasting caps
- (10) M1 activator
- (11) Composition C4 (C4) explosives
- (12) Dynamite explosives

b. Types of inert ammunition include--

- (1) M81 igniter, time-blasting fuse
- (2) M1A4 priming adapter
- (3) M14 time-delay fuse
- (4) M15 antitank (AT) mine
- (5) M19 AT mine
- (6) M21 AT

**APPENDIX B - DEPARTMENT OF THE ARMY (DA) FORM 5164-R (HANDS-ON EVALUATION)**

B-1. This appendix provides a copy of DA Form 5164-R. Locally reproduce DA Form 5164-R on 8 1/2-by 11-inch paper.

B-2. The use of this form is optional, but highly encouraged. This evaluation allows you to maintain and track the soldier's proficiency at the performance level.

B-3. Use the following instructions to complete DA Form 5164-R. Enter the title and number of the task to be evaluated at the top of the form.

- In column "a" enter the number of each performance step from the evaluation guide.
- In column "b" enter each performance step from the evaluation guide that corresponds to the number in column "a." Abbreviate information, if necessary.
- If more than one soldier will be evaluated on the specific task or the same soldier will be evaluated more than once, you may locally reproduce the partially completed DA Form 5164-R.
- Before evaluating a soldier, enter the date, the evaluator's name, and the soldier's name and unit.
- For each performance step evaluated, enter a check in column "c" (PASS) or column "d" (FAIL), as appropriate.
- Check the status block GO or NO-GO.

<b>HANDS-ON EVALUATION</b> For use of this form, see AR 350-57; the preponent agency is ODCSOPS		DATE _____	
TASK TITLE _____		TASK NUMBER _____	
ITEM <small>a</small>	PERFORMANCE STEP TITLE <small>b</small>	SCORE (Check One)	
		PASS <small>c</small>	FAIL <small>d</small>
		<input type="checkbox"/> P	<input type="checkbox"/> F
		<input type="checkbox"/> P	<input type="checkbox"/> F
		<input type="checkbox"/> P	<input type="checkbox"/> F
		<input type="checkbox"/> P	<input type="checkbox"/> F
		<input type="checkbox"/> P	<input type="checkbox"/> F
		<input type="checkbox"/> P	<input type="checkbox"/> F
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		<input type="checkbox"/> P	<input type="checkbox"/> F
		<input type="checkbox"/> P	<input type="checkbox"/> F
		<input type="checkbox"/> P	<input type="checkbox"/> F
		<input type="checkbox"/> P	<input type="checkbox"/> F

EVALUATOR'S NAME _____	UNIT _____
SOLDIER'S NAME _____	STATUS <input type="checkbox"/> GO <input type="checkbox"/> NO GO

**APPENDIX C - DEPARTMENT OF THE ARMY (DA) FORM 5165-R (FIELD EXPEDIENT SQUAD BOOK)**

C-1. This appendix provides a copy of an overprinted DA Form 5165-R for the tasks in this Soldiers Training Publication (STP).

C-2. Trainers should use the following instructions when completing DA Form 5165-R.

- Required DA Forms 5165-R (preprinted) are provided in this appendix. Blank reproducible forms may be obtained in Army Regulation (AR) 350-41. All forms may be reproduced locally on 8 1/2- by 11-inch paper.
- Make all entries in pencil.
- Enter the task number and a short title in the appropriate column or use the preprinted form provided.
- Record the date in the GO block if the soldier demonstrates task proficiency to the soldier's manual standards. Keep this form current by always recording the most recent date on which the soldier demonstrated task proficiency.
- Record the date in the NO-GO block if the soldier failed to demonstrate task proficiency to the soldier's manual standards. Soldiers who fail to perform the task should be retrained and evaluated until they can do the task. Once the soldier performs the task correctly, enter the date in the GO block and erase the previous entry from the NO-GO block.
- Read down each column (GO/NO-GO) to determine the training status of that individual. This will give the trainer a quick indication of tasks on which a soldier needs training or be evaluated.
- Read across the rows for each task to determine the training status of all the soldiers. The trainer can readily see on which tasks training should be focused.
- Add the names of newly assigned soldiers to one of the blank columns.
- Line through the training status column of any soldier who departs from the unit.

**NOTE TO THE TRAINING MANAGER:** The training status of groups can be maintained (such as team, squad, or platoon) in key critical military occupational specialty (MOS) at any level by entering the level (such as 1st platoon, 2nd platoon, or 3rd platoon) in the column headings. Simply have the trainers report the percentage of their soldiers who have (GO blocks) and have not (NO-GO blocks) demonstrated proficiency on each task and record this information for each level.

Field Expedient Squad Book														Sheet _____ of _____			
For use of this form, see AR 350-37. Proponent agency is DCSOPS.																	
User Application	Soldier's Name																
Task Number and Short Title	Status		Status		Status		Status		Status		Status		Status		Status		
	Go	No-Go	Go	No-Go	Go	No-Go	Go	No-Go	Go	No-Go	Go	No-Go	Go	No-Go	Go	No-Go	

DA FORM 5165-R, SEP 85 EDITION OF DEC 82 TO BE USED

**APPENDIX D - CONVERSION FACTORS (UNITED STATES (US) UNITS AND METRICS)****Table D-1. Metric Conversion Chart**

<b>US Units</b>	<b>Multiplied By</b>	<b>Equals Metric Units</b>
<b>Length</b>		
Feet	0.30480	Meters
Inches	2.54000	Centimeters
Inches	0.02540	Meters
Inches	25.40010	Millimeters
Yards	0.91400	Meters
<b>Area</b>		
Square inches	6.45160	Square centimeters
Square feet	0.09290	Square meters
Square yards	0.83610	Square meters
<b>Volume</b>		
Cubic inches	16.38720	Cubic centimeters
Cubic feet	0.02830	Cubic meters
Cubic yards	0.76460	Cubic meters
<b>Weight</b>		
Ounces	28.34900	Grams
Pounds	453.59000	Grams
Pounds	0.45359	Kilograms
<b>Temperature</b>		
Degrees Fahrenheit	Subtract 32, multiply by 5/9	Degrees Celsius



**Table D-1. Metric Conversion Chart (Continued)**

<b>Metric Units</b>	<b>Multiplied By</b>	<b>Equals US Units</b>
<b>Length</b>		
Centimeters	0.39370	Inches
Millimeters	0.03937	Inches
Kilometers	0.62137	Miles (statute)
Kilometers	0.53960	Miles (nautical)
Meters	3.28080	Feet
Meters	39.37000	Inches
Meters	1.09360	Yards
<b>Area</b>		
Square centimeters	0.15500	Square inches
Square meters	10.76400	Square feet
Square meters	1.19600	Square yards
<b>Volume</b>		
Cubic centimeters	0.06100	Cubic inches
Cubic meters	35.31440	Cubic feet
Cubic meters	1.30790	Cubic yards
<b>Weight</b>		
Grams	0.03527	Ounces
Kilograms	2.20460	Pounds
<b>Temperature</b>		
Degrees Celsius	Multiply by 9/5, add 32	Degrees Fahrenheit

## GLOSSARY

**1SG**

first sergeant

**A**

Army; armed; automatic

**AC**

active component

**ACCP**

Army Correspondence Course Program

**ACE**

air combat element (NATO); analysis and control element; aviation combat element (USMC); armored combat earthmover (M9)

**ACP**

Allied Communication Publication

**ADMIN**

administrative

**AFT**

Rear end of a boat.

**AHD**

antihandling device

**AIT**

advanced individual training

**AN**

annually

**AN/PSS-12**

hand-held, portable mine-detecting set

**AN/VVS-2**

vision viewer

**ANCOC**

Advanced Noncommissioned Officers Course

**Annotate**

To supply with critical or explanatory notes.

**appl**

applicable

**AR**

Army regulation; armor; angle of repose

**ARTEP**

Army Training and Evaluation Program

**ASI**

additional skill identifier

**AT**

antiterrorism; antitank

**ATTN**

attention

**AV**

audiovisual; autovon

**AVLB**

armored-vehicle-launched bridge

**AVLM**

armored-vehicle-launched MICLIC

**BA**

biannually

**bailey bridge**

A type of standard, hand-assembled military bridge.

**BII**

basic-issue items

**BL**

low battery

**BM**

bimonthly, benchmark

**BNCOC**

Basic Noncommissioned Officers Course

**BO**

blackout

**Bowl**

To carry material with a wheeled-tractor scraper/motorized scraper.

**BRT**

bright

**BW**

biweekly; biological warfare

**C**

chemical (graphics); Celsius

**C4**

composition C4; military plastic explosive

**CB**

chemical, biological; circuit board; construction battalion; clutch brake; circuit breaker

**cc**

cubic centimeter

**CKT**

circuit

**CM**

centimeter(s)

**CMF**

career management field

**common task**

A critical task for which all soldiers at a given skill level are accountable, regardless of their MOS. These tasks are found in the Soldier's Manual of Common Tasks (STP 21-1-SMCT and STP 21-24-SMCT).

**COMSEC**

communications security

**concertina**

A type of military barbed wire.

**CPL**

corporal

**CSM**

command sergeant major

**CTT**

common task test ; common task training

**cu**

cubic

**Cue**

(1) A word, situation, or other signal for action. An initiating cue is a signal to begin performing a task or task performance step. An internal cue is a signal to go from one element of a task to another. A terminating cue indicates task completion. (2) Used to contact an FH radio net when you are not an active member of that net. Cue can be used if you are operating in SC and wish to contact an FH net.

**CVR**

cover

**DA**

Department of the Army; Denmark; direct action

**DA Form**

Department of the Army Form

**DA Pam**

Department of the Army Pamphlet

**DC**

Dental Corps; District of Columbia; direct current

**DCU**

dispenser control unit; digital-control unit

**Defilade**

A fighting position offering cover and concealment to its occupant.

**DLC**

deadline code

**E1**

private 1

**E2**

private 2

**E3**

private first class

**E4**

specialist

**E5**

sergeant; Table value E5

**E6**

staff sergeant

**E7**

sergeant first class

**E8**

master sergeant; first sergeant

**E9**

sergeant major; command sergeant major

**ECCM**

electronic counter-countermeasures

**EGA**

extended graphics adapter; electronically-generated form

**EIC**

equipment identification code; end item code

**EM**

engineer manual; earthmoving; enlisted member

**emplace**

To put in place or position.

**ENG**

engineer

**EPMS**

Enlisted Personnel Management System

**F**

frequency; fail; failed; Fahrenheit; full

**FD**

firing device

**FH**

field hospital; frequency hopping

**FM**

field manual; frequency modulated/modulation

**Ford**

A shallow part in a body of water where the bottom permits the passage of personnel or vehicles.

**FREQ**

frequency

**FT; FT**

feet; firing table

**GED**

general education development

**GEMSS**

Ground-Emplaced Mine-Scattering System

**gen**

general; generator

**GS**

general support; geared steer; gear steer

**GTA**

graphic training aid

**H6**

composition H6

**hatch**

An arrangement for covering and protecting personnel on tracked vehicles.

**HE**

high explosive

**HE-WAM**

high-explosive, wide-area mine

**Hornet**

wide-area munition

**HWAS**

hazardous waste accumulation site

**IC**

indicator code, indicator control

**ICOM**

imbedded communications; Intercommunications System; integrated communications security

**IN**

Infantry; inch(es)

**intel**

intelligence

**IR**

infrared; intelligence requirements

**L**

left; length; lock; lubrication

**lb**

pound(s)

**LBE**

load-bearing equipment

**LBS-IN**

pounds per inch

**ldr**

leader

**LO**

learning objective; low; lubrication order

**LRA**

local reproduction authorized

**M.**

manual

**MDI**

modernized demolition initiator

**METL**

mission-essential task list

**METT-T**

mission, enemy, terrain, troops, and time available (Army); mission, enemy, terrain and weather, troops and support available, and time available (USMC)

**MGB**

medium girder bridge

**MICLIC**

mine clearing line charge

**MICLIC (mine clearing line charge) M58 Series**

A rocket propelled line charge, 106.5 meters (117 yards) long that can breach a lane 8 meters (8.8 yards) wide by 100 meters (110 yards) long. The MICLIC is mounted on a standard military (M353 or M200) trailer and has a 62-meter standoff capability. Engineer units will employ the MICLIC in response to minefield breaching requirements identified by the maneuver unit.

**MIN**

minimum; minute(s)

**MO**

Missouri; monthly

**MOPMS**

Modular-Pack Mine System

**MOS**

military occupational specialty; minimum operating strip

**MOUT**

military operations on urbanized terrain

**MPFD**

multipurpose firing device

**mph**

miles per hour

**MSG**

message; master sergeant

**MTP**

mission training plan; MOS training plan

**N**

north; neutral; northings; number

**NBC**

nuclear, biological, and chemical

**NCO**

noncommissioned officer

**NCOES**

Noncommissioned Officer Education System

**NCOIC**

noncommissioned officer in charge

**NCS**

net control station

**NG**

National Guard



**NIIN**  
national-item identification number

**NMC**  
nonmission capable

**NSN**  
national stock number; nonstandard number

**obstacle**  
An impediment to mobility. Can be natural or man-made.

**OIC**  
officer in charge

**OPER**  
operation

**ops**  
operational procedures; operations

**P**  
needs practice; pass; passed; barometric pressure; mean radius of curvature

**P.**  
.0001 times the difference in longitude or the difference in longitude divided by 10,000.

**pace**  
A full 30-inch step as used when marching (1.3 paces = 1 meter).

**PAM**  
pamphlet

**pass/fail**  
A pass/fail standard of evaluation whereby the soldier either does or does not meet the standard.

**performance measures (PMs)**  
Those behaviors/product characteristics which the trainer observes/checks to determine if the soldier has performed the task correctly.

**PETN**  
pentaerythrite tetranitrate

**PFC**  
private first class

**PLDC**  
Primary Leadership Development Course

**PLT**  
platoon

**PM**  
provost marshal; program manager; preventive maintenance

**PMCS**

preventive-maintenance checks and services

**PRESS**

pressure

**primed**

Fitted with a blasting cap or other booster charge capable of initiating a larger explosion.

**psi**

pounds per square inch

**PVT**

private; point of vertical tangency

**QT**

quarterly

**R**

reverse; right; radius of curvature; rewind

**R1**

reverse first

**R2**

reverse second

**RC**

reserve component

**RDX**

cyclotrimethylenetrinitramine (commercial name - cyclonite)

**RE**

relative effectiveness

**RECON**

reconnaissance

**RP**

Republic of Philippines; release point; rally point; reference point; red phosphorus

**rpm**

revolutions per minute

**S**

secret; safe; grid distance; geodetic distance; second; slope distance; start

**S&H**

safety and handling

**S/D**

self destruct

**SA**

semiannually; situational awareness

**SATS**

Standard Army Training System

**SC**

supply catalog; Signal Corps; single channel

**SCARIFY**

To scratch or cut to loosen the soil.

**scraper**

Engineer equipment used to remove large quantities of earth.

**SD**

solvent, dry cleaning; self-destruct; special duty; slope distance

**sec**

second(s); section

**SFC**

special forces command; sergeant first class

**SGM**

sergeant major

**SGT**

sergeant

**SINGGARS**

Single-Channel, Ground-to-Air Radio System

**SINGGARS-V**

Single-Channel, Ground-to-Air Radio System-Vehicular

**SKILL LEVEL**

Identifies task proficiency or ability typically required for successful performance at the grade with which the skill level is associated. The skill levels by grade are shown below: Skill levels => 1 2 3 4 5; Enlisted E 1/2, 3/4, 5, 6, 7, 8/9; Warrant W, 1/2, 3, 4, 5; Officers O 1/2, 3, 4, 5, 6

**SL**

skill level; side lap

**SM**

soldier's manual

**SMCT**

soldier's manual of common tasks

**SOI**

signal operation instructions; specific operation instructions

**SOP**

standing operating procedure

**SPC**

specialist; standard printing color

**sqd**

squad

**SSG**

staff sergeant

**SSN**

social security number

**STP**

soldier training publication

**suppl**

supplement

**SUST**

sustainment

**TAMMS**

The Army Maintenance Management System

**TASK**

A clearly defined and measurable activity accomplished by individuals and organizations. It is the lowest behavioral level in a job or unit that is performed for its own sake. It must be specific; usually has a definite beginning and ending; may support or be supported by other tasks; has only one action and, therefore, is described using only one verb; generally is performed in a relatively short time (however, there may be no time limit or there may be a specific time limit); and it must be observable and measurable. The task title must contain an action verb and object and may contain a qualifier. Types: (subsequent entries)

**TC**

technical coordinator; training circular; track commander; tank commander

**TEK**

traffic encryption key

**TM**

technical manual; team

**TNG**

training

**TNT**

trinitrotoluene

**U**

unclassified; up; untrained; unlocked

**US**

United States

**USASMA**

United States Army Sergeants Major Academy

**Volcano**

A multiple-delivery mine system dispensed from the air or on the ground.

**w/**  
with

**WAM**  
wide-area munition; wide area mine

**WK**  
weekly

## REFERENCES

### Required Publications

Required publications are sources that users must read in order to understand or to comply with this publication.

#### Department of Army Forms

DA FORM 2404	Equipment Inspection And Maintenance Worksheet 1 April 1979
DA FORM 5988-E	Equipment Inspection Maintenance Worksheet. 1 March 1991

#### Department of Army Pamphlets

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#### Field Manuals

FM 20-32	Mine/Countermine Operations. 29 May 1998
FM 21-60	Visual Signals. 30 September 1987
FM 24-18	Tactical Single-Channel Radio Communications Techniques. 30 September 1987
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FM 25-100	Training the Force. 15 November 1988
FM 25-101	Battle Focused Training. 30 September 1990
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FM 25-5	Training for Mobilization and War. 25 January 1985
FM 5-103	Survivability. 10 June 1985
FM 5-250	Explosives and Demolitions. 30 July 1998
FM 5-277	M2 Bailey Bridge. 9 May 1986
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FM 7-8	Infantry Rifle Platoon and Squad. 22 April 1992
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#### Lubrication Orders

LO 5-2350-262-12	Armored Combat Earthmover (ACE), M9 (NSN 2350-00-808-7100) (This Item is Included on EM 0035). 8 November 1993
LO 5-5420-202-12	Launcher, M60A1 Tank Chassis, Transporting: for Bridge, Armored-Vehicle-Launched, Scissoring Type, Class 60 (NSN 5420-00-889-2020) (This Item is Included on EM 0044). 13 March 1992
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#### Other Product Types

ACP 125 US SUPP-1	Communications Instructions Radiotelephone Procedures for Use by United States Ground Forces. 1 October 1985
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UNIT SOI	Unit/Unit's Signal Operation Instructions (SOI)

#### Soldier Training Publications

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STP 21-24-SMCT	Soldier's Manual of Common Tasks (SMCT) Skill Levels 2-4. 1 October 1992
STP 7-11BCHM1-SM	Soldier's Manual, Skill Level 1, CMF 11, Infantry 1 March 2000

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TM 9-1375-213-12	Operator's and Unit Maintenance Manual (Including Repair Parts and Special Tools List): Demolition Materials with Changes 1 - 19. 30 March 1973
TM 9-1375-215-13&P	Mine Clearing Line Charge - MICLIC (Army) for Operators 31 October 1997

### Related Publications

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AR 350-41	Training in Units. 19 March 1993
AR 350-57	Self-Development Test. 17 June 1994
AR 614-200	Enlisted Assignments and Utilization Management. 12 July 2001

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FM 7-7J	Mechanized Infantry Platoon and Squad (Bradley). 7 May 1993

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GTA 05-10-036	Mine Data Card Part 1. 28 May 1997
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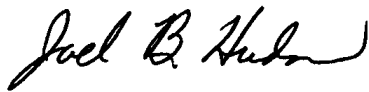
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**STP 5-12B1-SM**  
**18 OCTOBER 2002**

By Order of the Secretary of the Army:

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